Petition

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ALEXANDER L. STEVAS,

No. **81-1661**

In the Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,
Petitioner,

vs.

DEVEX CORPORATION, ET AL.,
Respondents.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

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QUESTIONS PRESENTED

1. Does 35 USC 284 require the award of prejudgment interest on unliquidated reasonable royalty patent infringement damages where there has been no finding of bad faith or other exceptional circumstances against the infringer but rather a finding (approved by the court below) that the infringer "acted in good faith and not recklessly"? This is the holding of the Third Circuit in this case and it is in direct conflict with decisions in the Seventh, First, Ninth and Sixth Circuits.
2. Where the master found as a fact that a universally rejected royalty rate sought by the patent owner *after* the patent was held valid was "too high", and he further found on the record that a lower rate was the reasonable royalty, may the reviewing courts reject the master's royalty fact finding as too speculative and adopt in its place the rejected royalty found to be "too high" and therefore *un*reasonable? This is the holding of the Third Circuit in this case which substitutes reviewing court conjecture for a contrary solid fact finding of the master and also conflicts with the Second Circuit.
3. Where the literal language of a patent claim is met by the prior art but a federal court of appeals has validated the claim by narrowing it in reliance upon proofs of a vitalizing ingredient causing an unexpected coaction under certain process conditions to produce unique end-results, may another federal court of appeals in the same case subsequently ignore the proofs required by the first court and hold infringement by, (a) processes which do not use the vitalizing ingredient, or, (b) processes not shown to have the same coaction, or (c) processes not producing the unique end-results? Can the claim, when so expanded beyond its earlier narrowed, judicial construction, "particularly point out and distinctly claim" the invention as 35 USC 112 requires?

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[1] This plaintiffs in this case are: Devex Corporation, an Ohio Corporation; Technograph, Inc., a North Carolina corporation; Theodore A. TeGrotenhuis, an Ohio resident; Frederick B. Ziesenheim, a Pennsylvania resident; Marjorie E. TeGrotenhuis, an Ohio resident; William C. McCoy, Jr., an Ohio resident; and Katharine M. Bassett, a Connecticut resident. The sole defendant is General Motors Corporation.

GM's Rule 28.1 listing is Exhibit I, p. 27, below.

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No.

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OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,
Petitioner,

vs.

DEVEX CORPORATION, ET AL.,
Respondents.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

Petitioner, General Motors Corporation, respectfully prays that a writ of certiorari issue to review the judgment entered on December 15, 1981 by the United States Court of Appeals for the Third Circuit.

OPINIONS BELOW

The accounting opinion of the Court of Appeals for the Third Circuit immediately preceding this petition is reported at ____ F(2d) ____. (Joint App., 304a). The District Court opinion on the accounting is reported at 494 Fed. Supp. 1369. (Joint App., 280a).

The initial opinion of the Court of Appeals for the Seventh Circuit holding the judicially redrafted and restricted claim valid in the consolidated case of *Devex v. General Motors and Houdaille Industries* is reported at 321 F(2d) 234 (cert. den. 375 U.S. 971). (Joint App., 61a). The explanatory opinion by the Seventh Circuit in *Devex v. Houdaille Industries,* is reported at 382 F(2d) 17. (Joint App., 85a).

The opinion, findings of fact, and conclusions of law of the District Court for the District of Delaware holding no infringement by any then-accused process in this case are reported at 316 Fed. Supp. 1376 (Joint App., 105a). The partial reversal of this noninfringement decision by the Court of Appeals for the Third Circuit is reported at 467 F(2d) 257 (cert. den. 411 U.S. 973) (Joint App., 138a).

JURISDICTION

The Judgment of the Court of Appeals is dated and was entered December 15, 1981. A timely petition for rehearing was denied January 13, 1982, and this petition for a Writ of Certiorari was filed within 90 days of that date. The jurisdiction of this Court is invoked under 28 USC 1254(1).

STATUTES INVOLVED

Questions one and two involve 35 USC 284, which provides in its pertinent portions that the court shall award "damages adequate to compensate for the infringement . . . together with interest and costs as fixed by the court." Joint App., 1 a.

Question three involves 35 USC 112. In its pertinent portion, it requires patent claims "particularly pointing out and distinctly claiming the subject matter the applicant regards as his invention." Joint App., 1a.

STATEMENT OF THE CASE[a]

Jurisdiction of the courts below rests on 28 USC 1338(a) and 28 USC 1291.

Claim 4[1], the only claim here at issue, concerns an old process of coating steel with a lubricant prior to cold forming to a useful shape such as an automobile bumper. The distinguishing feature of the process is the inclusion of borax as the inorganic compound in the lubricant. Otherwise identical processes not using borax in the lubricant and held to be non-infringing were satisfactorialy used by GM throughout the patent period to make bumpers. The borax-including process, under some conditions, achieves a chemical coaction between borax and the other ingredients which is said to provide increased die life and ease of cleaning of the work after drawing. There has been no proof that such coaction occurs in any accused bumper making process, or that die life and cleaning were different than in the absence of borax, or alleged equivalent.

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[a] This Petition is based on error of law by the Court of Appeals for the Third Circuit involving irreconcilable conflicts with other federal courts of appeal and misapplication of controlling statutes and decisions. Only a minute portion of the joint appendix requires consideration on this Petition. Footnotes herein quote this portion of the rulings below, making this Petition essentially self-contained.

[1] The claim reads:

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed there through a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

The Seventh Circuit Non-Literal Validating Claim Construction

This case was initially filed in the Northern District of Illinois, where it was consolidated on plaintiffs' motion for trial on the common issue of patent validity with a related infringement action filed by plaintiffs against Houdaille Industries. After a lengthy trial, the District Court found that the claim was invalid over the prior art.[2]

The Court of Appeals confirmed the lower court's finding that the claim, if literally construed, is invalid over the prior art. But it accepted the representations of plaintiffs and validated the claim by redrafting and restricting it to particular process conditions which produced coaction products having unique properties.[3] These coaction products were alleged by plaintiffs to be essential.[4] Specifically, the court of appeals relied upon plaintiffs' laboratory evidence that, under the high pressures and temperatures of the test process, and with the high borax lubricant used, "new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties." This surprising coaction, which was attributed to the borax ingredient added to the prior art soap lubricant, was considered to be a patentable improvement.[5] The borax chemical coaction relied upon is not described in the patent.[6] The Court of Appeals also gave emphasis to testimony that greatly increased die life was achieved.[7]

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[2] "The British patent 494,830 therefore contains disclosure of a lubricating composition for drawing and deforming ferrous metal within the broad terminology employed in claim 4 of the patent in suit." Finding of Fact No. 6(a). Nos. 56 C1912 and 57 C892, N.D. Ill., June 29, 1962. (Joint App., 33a, 34a).

[3] *Devex v. General Motors, Devex v. Houdaille Ind.*, Opn. July 12, 1963 Court of Appeals for the Seventh Circuit (Joint App., 61a, 66a).

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[4] "Plaintiffs alleged at trial that compounds other than zinc phosphate and the borax are formed by chemical reaction of borax with soap and the zinc phosphate of the phosphate coating, and are essential to the successful operation of the process described in claim 4 of the patent in suit." Fact Finding No. 12. Nos. 56 C1912 and 57 C892, N.D. Ill., June 29, 1962. (Joint App., 43a).

[5] See Para. 3, opinion Court of Appeals, Third Circuit dated Dec. 15, 1981. (Joint App., 305a).

[6] "The patent in suit does not describe any chemical reactions in the drawing operations with soap-borax applied over phosphate coatings which produce or require the production of any other compounds to be essential to successful drawing operations; claim 4 of the patent in suit contains no reference to or requirement of the presence of such other compounds in the operation of the process defined by the claim."
Finding of Fact No. 12. Nos. 56 C1912 and 57 C892, N.D. Ill., June 29, 1962. (Joint App., 43a).

[7] "..... Testimony showed tool and die life was increased one thousand fold so that for given tools, three or four hundred thousand pieces were run where previously only three or four hundred pieces could be run. The Henricks' process made it possible to manufacture articles of superior quality at a much lower cost, the advantage being so marked in some cases as to spell the difference between success and failure on heavy reductions and difficult extrusions."
(Joint App., 67a).

The Seventh Circuit Borax Bumper Process Noninfringement Ruling

This case was then transferred on plaintiffs' motion to the District of Delaware for an infringement trial. But the related *Houdaille* case remained in the Northern District of Illinois.

In the *Houdaille* case, plaintiffs moved for summary judgment of infringement on the sole ground that Houdaille's manufacture of bumpers using soap and borax lubricant applied over phosphate literally infringed. The motion was granted in reliance upon the broad literal claim language, which clearly covered the process.[8] The Court of Appeals reversed, stating that "It is difficult to discern how plaintiffs can contend with any plausibility that defendant is an infringer, based upon a literal reading of the claim", for in the "previous case plaintiffs urged as a ground for sustaining validity a narrow and restricted application of the 'specific embodiment of claim 4.'"[9] The Court of Appeals then quoted plaintiffs' representation on the chemical coaction of soap, *borax,* and phosphate that it had adopted in its reversed earlier validity decision.[10] The Court then noted that "having obtained a decision of validity on a narrow and restricted basis" plaintiffs "now contend, inconsistently we think, that the claim must be applied literally to defendant's alleged infringing process."[11]

The Court of Appeals held that "...if a literal reading of the claim had been relied upon, we would have affirmed the

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[8] Opin., *Devex v. Houdaille,* 57 C892, N.D. Ill., Dec. 15, 1965. (Joint App., 76a, 84a).

[9] Opn. July 12, 1967, Court of Appeals for the Seventh Circuit (Joint App., 93a).

[10] Id.

[11] Id.

District Court in its holding of invalidity in view of the prior art. . . . ".[12] Holding that the claim, as previously restricted by it, does not even cover all processes with borax in the lubricant, the Court rejected any claim construction that:[13]

> ". . . would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results."

The Interlocutory Third Circuit Borax Infringement Ruling

This case was tried on infringement in the District of Delaware. Plaintiffs accused three processes, each using borax in the lubricant. Plaintiffs introduced evidence on alleged borax coaction similar to that relied upon in the Seventh Circuit validity decision. GM introduced contrary evidence. The District Court found that:[14]

> There is no preponderance of the evidence in favor of plaintiffs that in the accused processes (a) there is a new coaction between the soap, borax and phosphate, (b) new compounds or glassy amorphous compounds are formed, (c) the formation of water insoluble organic compounds is inhibited, (d) tool and die life is greatly increased, and (e) there is no cleaning problem, or that any of these results is achieved. The credible evidence is to the contrary and preponderates in favor of defendant.

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[12] Id. at 95a

[13] Id. at 93a-94a

[14] Conclusion of Law No. 5 (No. 3058, D. of Del., Sept. 8, 1970, Joint App., 132a).

Since this disposed of the evidence relied upon by the Seventh Circuit in holding validity, judgment of noninfringment was entered for GM.[15]

The Court of Appeals for the Third Circuit reversed. It states in its final, 1981, opinion that "we concluded that the accused practices led to satisfactory lubricity and cleanability, which meant that those practices infringed."[16]

The Accounting

Accounting proceedings followed, and led to the final Third Circuit judgment here sought to be reviewed. Plaintiffs accused a total of 61 processes as infringements. The judgment awards reasonable royalty damages on 14 of these processes, all bumper processes.

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[15] Joint App. 137a.

[16] "*** We rejected the district court conclusion "that infringement was not proved because Devex failed to establish that General Motors achieved the unexpected results that made the Henricks combination patentable." 467 F.2d at 260. After examining the materials before us, we concluded that the accused practices led to satisfactory lubricity and cleanability, which meant that those practices infringed. We specifically rejected General Motors' contention that, because the chemical reactions involved were arguably different from those taught by the Henricks patent, the General Motors practices did not infringe.

* * *

Thus, because the results produced by the accused practices were identical to those produced by the Devex patent, the accused practices infringed. The differences between the specific chemical processes of the Devex patent and those of the accused practices were not determinative, so long as the results were identical." Para. 6, Opn. Dec. 15, 1981. (Joint App., 306a-307a).

The Court of Appeals confirmed the master's findings that the patent process was not essential to GM and that viable non-infringing alternatives were available.[17]

Infringement

The Court of Appeals held that the eight accused bumper processes using borax lubricants infringed, notwithstanding the infringement trial fact findings that the borax coaction was not proved and the absence of any proofs of coaction on the accounting.[18] The Court stated that its earlier interlocutory infringement holding concluded that such practices led to satisfactory lubricity and cleanability, "which meant that these practices infringed."[19]

In one accused bumper practice the only borax-usage was in a neutralizing rinse prior to the application of a nonborax lubricant. The master had found that the only purpose of the borax was to neutralize and that the technique was old and well known.[20] The District Court reversed the master's ruling

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[17] "23. The Special Master's factual finding as to infringement in bumper making, in sum, is that the three major infringing divisions (Pontiac, Chevrolet and Cadillac) used the Henricks process because it was better than non-infringing alternatives, but not because it was essential or because there were no commercially viable non-infringing alternatives available. Indeed, Oldsmobile's experience proves the availability of practicable alternatives. There were periods when one or more of the infringing divisions used nonaccused or non-infringing practices. ***" Para, 23, Opn. Dec. 15, 1981 (Joint App., 313a, 321a).

[18] fn. 16, p. 8, *supra*.

[19] Id.

[20] "i) There was no evidence that borax (or equivalent) rinses were used to lubricate the metal or to aid in cleaning. . . . . ii) The borax was used solely to neutralize acid carryover resulting from the phosphate bath. . . . . iii) . . . . Moreover, Henricks testified that 'neutralizing rinses were

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of noninfringement because the history of the litigation shows it was immaterial "why Claim 4 specifies the use of borax."[21] The decisive infringement-creating act, which the court considered to be judicially written into the claim, was that the work be cleaned after formation. The Court of Appeals affirmed.[22]

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old and well known.' . . . . iv) Henricks did not invent the use of borax as a neutralizing rinse . . . . v) Defendant thought it was using borax rinses to neutralize acid, and not for lubrication or cleanability. Defendant used non-accused rinses as well as accused rinses, and easily shifted back and forth. . . . ." Para. 11, Opn. Dec. 15, 1981 (Joint App., 320a).

"(e) The evidence is uniform to the point that defendant *thought* it was using borax rinses to neutralize acidity, and not to get added lubricity or cleanability. There are also good indications that defendant did not in fact achieve better lubricity or cleanability from the use of borax rinses." Section II C 2, Report of Special Master dated Feb. 7, 1980. (Joint App., 194a).

[21] Opn. August 22, 1980 (Joint App. 289a).

[22] "29. . . . . The trial court interpreted prior decisions in the Devex litigation as "holding that Claim 4 requires cleaning as an integral step of its process." . . . . . The court stated:

> 'The primary importance of Devex's process was not that the addition of borax somehow enhanced lubricity. Rather, the addition of borax inhibited the formation of zinc stearate resulting in products that could be easily cleaned. [In the validity phase of this litigation], Devex . . . relied upon the ease of cleaning to defend the validity of what would otherwise have been an overly broad claim.'

* * *

"30. The trial court then turned to the issue of whether borax rinses infringed the Devex process. He ruled that the borax rinses did infringe the patent, but only where the parts formed after the rinse was applied were cleaned. In other words, if the rinse performed the same role as the lubricant, it infringed the patent." Para. 29-30, Opn. Dec. 15, 1981 (Joint App., 336a).

Five of the bumper making processes used TKPP lubricants, but no borax.[23] These were held to infringe. Despite the undisputed evidence that TKPP is a chemical compound not described in the patent and differing from borax, TKPP cannot have the same chemical reactions as borax and has not been shown to undergo any chemical reactions. The Third Circuit relied upon this Court's ruling in *Graver Tank & Mfg. Co. v. Linde Air Products*, 339 U.S. 605 (1950) and lower court decisions on "equivalents" which only involved claims not previously judicially construed.[24]

The Reasonable Royalty

Plaintiffs' evidence on the reasonable royalty was based on the incorrect factual premise that no viable alternatives existed. The master rejected their proposed royalty rate. He then determined the reasonable royalty under the ceiling defined by the 0.75% rate in the proposed but unacceptable license offers widely circulated by plaintiffs which he in effect found to be an unreasonable royalty.[25] Largely because the proffered licenses were uniformly rejected, the master found the proposed rate was "too high."[26] He then considered, on the evidence, what lower royalty would be reasonable, and found that two thirds of the unacceptable rate, or 0.50%, was the reasonable royalty.[27]

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[23] TKPP is tetrapotassium pyrophosphate ($K_4P_2O_7$). Borax is sodium tetraborate ($Na_2B_4O_7$). Oxygen is the only common element.

[24] Opn. Dec. 15, 1981 (Joint App., 324a).

[25] "Starting in November 1964, plaintiffs submitted a proposed form of license (DX A-66a), to each and every company it thought was using the teaching of the Henricks patent (Shortt, Tr. 2144, 2413-2415). The license offer provided for a royalty based on three-fourths of one percent (.75%) of the net purchasing or sale price of the item so produced, or one per cent (1%) of manufactured cost (DX A-66(a)).

The importance of plaintiffs' offer to license is underscored by its timing. The offer was made in November 1964, and came just ten months after the validation of the patent by the declination of the United States Supreme Court to grant review. (Certiorari was denied on January 6, 1964. 375 U.S. 971). Plaintiffs were then on top. . . ." Section IIID7, Report of Special Master, Feb. 7, 1980 (Joint App., 251a).

The District Court found that none of the master's fact findings were clearly erroneous.[28] But he nevertheless reversed the master on the ground that the master's 0.50% figure was unduly speculative and substituted for it the universally rejected 0.75% royalty rate the master had found to be "too high."[29] The Court of Appeals also confirmed all of the master's fact findings, but even so it affirmed the District Court 0.75% royalty rate.[30]

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[26] "E. The Hypothetical Negotiations

* * *

4. The parties would agree that .36 per cent was too high. It is the same, taking into account the reduction for the use of defendant's dealer price figures recognized by plaintiffs' experts at trial, the .75 per cent offer which was agreeable to no user of the process even after the patent was validated, when it might have been expected that a reasonable offer to license would have at least provoked the interest of industry. But the negotiators would find that it was bringing them closer to agreement." Section IIIE, Report of Special Master, Feb. 7, 1980 (Joint App., 256a).

[27] As the Court of Appeals stated: "25. The Special Master decided to base the reasonable royalty on an offer made by plaintiffs in 1964 to license the patent for three quarters of one percent (.75%) of the sale price of the bumpers. The Special Master postulated hypothetical negotiations, stressed the availability of viable alternatives to the Devex patent, added that Oldsmobile produced bumpers without the Devex process but that Chevrolet, Pontiac and Cadillac were loyal to the Devex process, noted that the Devex process did have a considerable value, and ultimately reduced the .75% figure — which he decided would have been plaintiffs' opening offer — by approximately one-third." Para. 25, Opn. Dec. 15, 1981 (Joint App., 315a). See also, Joint App., 250a-256a.

[28] Para. 39, Opn., Court of Appeals for the Third Circuit, Dec. 15, 1981 (Joint App. 322a).

Prejudgment Interest

The court below held that the master properly awarded prejudgment interest. Its stated justification is the generalized observation, applicable to every case, that "To do otherwise . . . would give defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs," and "would encourage other defendants to draw out litigation for as long a period as possible."[31] The Court did not refer to the master's approved finding that GM had "acted in good faith and not recklessly"[32], or to the two district court judgments after lengthy trials which had upheld GM's position on patent invalidity and its position on noninfringement.[33] The Court conceded that its ruling on prejudgment interest is inconsistent with the law in the Seventh Circuit, which refuses to permit prejudgment interest in the absence of a finding of bad faith or other exceptional circumstances.[34]

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[29] Open Aug. 22, 1980, Joint App. 294a.

[30] Para. 39 and 65, Opn. Dec. 15, 1981 (Joint App., 322a and 334a).

[31] Para. 70, Opn. Dec. 15, 1981 (Joint App., 336a).

[32] "Having considered plaintiffs' various submissions, the history of the case and the record in its entirety impel me to conclude that defendant acted in good faith and not recklessly. There will be no punitive award in the shape of multiple damages. And plaintiffs will pay their own counsel fees." Section IIIB, Report of Special Master, Feb. 7, 1980 (Joint App., 209a).

[33] Joint App., 60a, 137a.

[34] "76. The result reached here is inconsistent with that reached in *Wahl v. Carrier Manufacturing Co.*, 511 F.2d 209 (7th Cir. 1975), where the

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ARGUMENT

This Court Should Resolve the Several Conflicts Between the Courts of Appeal on Whether 35 USC 284 Requires Prejudgment Interest Awards Where the Defendant Has Acted in Good Faith and Its Position on Validity and Infringement Has Been Held Meritorious

The patent statutes were silent on prejudgment interest until the August 1, 1946 revisions eliminated profits of the infringer as an element of recovery and provided for "general damages . . . not less than a reasonable royalty . . . together with such costs, and interest, as may be fixed by the court."[35] This language is consistent with decisions under the preceding statutes, since prejudgment interest had been awarded on unliquidated reasonable royalty damages only where there was a finding that the infringer had acted in bad faith. *Duplate Corp. v. Triplex Safety Glass Co.*, 298 U.S. 448, 459 (1936), and cases cited therein.

Despite *Duplate*, a clear and irreconcilable split now exists among the courts of appeal on whether 35 USC 284 and its 1946 predecessor changed the prior law on prejudgment interest. Most decisions hold that the 1946 Act codified — but did not change the continuing authority of — *Duplate* and similar decisions[36] which forbid prejudgment interest in the

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court ruled that 'interest should run from the date damages are liquidated.' 511 F.2d at 215. ****" Para. 76, Opn. Dec. 15, 1981 (Joint App., 339a).

[35] Section 4921, R.S. Joint App. 2a.

[36] *Tilghman v. Proctor*, 125 U.S. 136, 160 (1888); *Crosby Steam Gage v. Consolidated Safety-Valve*, 141 U.S. 441, 457 (1891).

absence of "special circumstances." There are decisions to this effect in the Seventh Circuit, extending from 1948 to 1979, and decisions to the same effect in the First, Sixth and Ninth Circuits.[37] They require findings of "special circumstances" based on reckless or bad faith conduct of the infringer before the court is permitted to exercise its discretion and award prejudgment interest on unliquidated reasonable royalty damages.

The Third Circuit in the present case, and perhaps the Fourth Circuit,[38] follow a conflicting view providing prejudgment interest under 35 USC 284 to compensate the plaintiff for delayed royalties and to deter other defendants from drawing out litigation as long as possible, even though it has been found that the defendant has "acted in good faith and not recklessly"[39] and two trial courts found the defense meritorious.[40] This view requires no special circumstances because the justifying reasons are present in any case, thus making prejudgment interest mandatory — not discretionary. As a result, it punishes the good faith defendant even if the plaintiff has unduly prolonged the case or engaged in other reprehensible conduct.

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[37] Seventh Circuit: *Dixie Cup Co. v. Paper Container Mfg. Co.*, 169 F(2d) 645, 651 (1948); *Union Carbide Corp. v. Graver Tank Co.*, 282 F(2d) 653, 676-7 (1960) (cert. den. 365 U.S. 812); *Wahl v. Carrier Mfg. Co., Inc.*, 511 F(2d) 209, 214-5 (1975); *CBS v. Zenith Radio Corp.*, 537 F(2d) 896, 897-8 (1976); *Ellipse Corp. v. Ford Motor Co.*, 614 F(2d) 775 (1979); First Circuit: *Russell Box Co., v. Grant Paper Box Co.*, 203 F(2d) 177, 180-81 (1953), (cert. den. 346 U.S. 821; reh. den. 346 U.S. 905). Sixth Circuit: *Wm. Bros. Boiler Mfg. Co. v. Gibson-Stewart Co.*, 312 F(2d) 385, 387 (1963). Ninth Circuit: *Radiator Specialty Co. v. Micek*, 395 F(2d) 763, 764-5 (1968). See also *H. K. Porter Co. v. Goodyear Tire & Rubber Co.*, 536 F(2d) 1115, 1124 (6th Cir. 1976).

[38] *Marvel Specialty Co. v. Bell Hosiery Mills, Inc.*, 386 F(2d) 287, 290 (fn. 3) (1967). (cert. den. 390 U.S. 1030).

[39] fn. 32, p. 13, supra.

[40] Joint App., 60a, 137a.

In *Georgia-Pacific Corp. v. U.S Plywood-Champion Papers, Inc.*, 446 F(2d) 295, 302 (1971), the Second Circuit indicated in a dictum that "Although the question is not free from doubt," the 1946 Act was "intended to grant the trial court its traditional discretionary power in equity." The decision affirmed an award of prejudgment interest from the date of last infringement because of the reckless conduct of the infringer, consistently with *Duplate* and the subsequent decisions by various courts of appeal construing 35 USC 284 as a codification of *Duplate*.

A further conflict exists between the Courts of Appeal on the controlling significance of this Court's quotation in *Aro Mfg. Co. Inc. v. Convertible Top Replacement Co., Inc.*, 377 U.S. 476, 505-506 (1964), that:

> "The object of the bill is to make the basis of recovery in patent-infringement suits general damages, that is, any damages the complainant can prove, not less than a reasonable royalty, **together with interest from the time infringement occurred**, rather than profits and damages." H.R. Rep. No. 1587 79th Cong., 2nd Sess. (1946), to accompany H.R. 5311, at 1-2; S. Rep. No. 1503, 79th Cong., 2d Sess. (1946), to accompany H.R. 5311 at 2." (emphasis added)

The Second, Sixth, Seventh and Tenth Circuits have each concluded that the quotation emphasized above was inadvertently taken from language in an earlier version of the bill which was objected to and deleted from the statute before it became law, and is not a controlling holding by this

Court.[41] As such, it negates rather than supports prejudgment interest in the absence of "special circumstances." The Third Circuit has taken a contrary view in the present case — and treats the stricken prejudgment interest language as though it were present in 35 USC 284 and controlling.[42] Only this Court can settle the status and effect of its own *Aro v. Convertible* quotation.

The 35 years since the 1946 Act, and the 18 years since this Court's statement in *Aro v. Convertible,* supra, have led to conflict rather than consensus by the courts of appeal on prejudgment interest under 35 USC 284. As the decisions now stand, no court can make a ruling on prejudgment interest under the statute without conflicting with at least one and perhaps several courts of appeal. The matter is of substantial importance because patent cases are almost always protracted and prejudgment interest is generally as large as the reasonable royalty damage award. It is more than half of the judgment in this case.

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[41] Second Circuit: *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc.* 446 F(2d) 295, (2d Cir., 1971) (cert. den. 404 U.S. 870); *Foster v. American Machine & Foundry Co.,* 492 F(2d) 1317, 1324 (2d Cir., 1974) (cert den. 419 U.S. 833, reh. den. 419 U.S. 1061); *Wm. Bros. Boiler & Mfg. Co. v. Gibson-Stewart Co.,* 312 F(2d) 385, 387 (6th Cir. 1963); *General Electric Co. v. Sciaky Bros., Inc.* 415 F(2d) 1068 (6th Cir. 1969); *Wahl v. Carrier Mfg. Co., Inc.,* 511 F(2d)209 (7th Cir., 1975); *Maloney-Crawford Tank Corp. v. Sauder Tank Co., Inc.,* 511 F(2d) 10, 13-14 (10th Cir., 1975).

[42] "69 . . . We are not, however, entirely without guidance on this question. In *Aro Manufacturing Co. v. Convertible Top Co.,* 377 U.S. 476 (1964), the Supreme Court examined the 1946 amendment to 35 U.S.C. §284, pursuant to which a claimant became entitled to recover damages instead of damages plus profits:

> 'The purpose of the change was precisely to eliminate the recovery of profits as such and allow recovery of damages only.
>
> "The object of the bill is to make the basis of recovery in patent-infringement suits general damages, that is, any damages the complainant can prove, not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages." H.R. Rep. No. 1587 79th Cong., 2nd Sess. (1946), to accompany H.R. 5311, at 1-2; S.Rep. No. 1503, 79th Cong., 2d Sess. (1946), to accompany H.R. 5311 at 2.'

377 U.S. at 505-06 (footnote omitted). Thus, in *Aro* the Supreme Court identified the purpose of the amendment, and stated that it was part of that purpose that damages in the amount of a reasonable royalty plus interest "from the time infringement occurred" be recoverable." Para. 69, Opn. Dec. 15, 1981 (Joint App., 335a).

Had this case remained in the Seventh Circuit as did the *Houdaille* case, there would be no award of prejudgment interest on damages, and the judgment would be less by more than $11 million.

Prejudgment interest was awarded here despite (a) an explicit finding of good faith, nonreckless conduct, (b) favorable decisions for GM by both the Illinois and Delaware trial courts, and (c) decisions adverse to plaintiffs on 47 of 61 charged processes. This case induces patent owners to unduly prolong litigation to multiply prejudgment interest and it will seriously deter future challenges to weak or narrowly restricted patents, even though such challenges are an important public service, and should not be "muzzled." *Lear, Inc. v. Adkins,* 395 U.S. 653, 670 (1969).

This Court Should Resolve the Conflicting Views Between the Second Circuit and the Third Circuit on the Evidentiary Significance of Exorbitant License Offers Rejected by All Potential Licensees

The master in this case faithfully followed the approach of the Second Circuit in *Foster v. American Machine and Foundry Co.*, 492 F(2d) 1317, 1321-2 (1974), a case involving a patent to a pipe welding system. The master in that case rejected a running, or throughput, royalty based on the value of the welded pipes produced by the mill operators in their infringing usage of the patent, finding that the operators were unwilling to pay on such basis. He accordingly turned to the hypothetical negotiations between the patent owner and the vendor of the equipment, assessed the evidence of patent value, and based the royalty on the cost of the equipment.

This royalty figure, much lower than the "throughput" royalty unsuccessfully sought by the patentee, was confirmed by the District Court and affirmed on appeal. It was held that the unacceptability of throughput royalty precluded any award on this basis and that the master's alternative, despite the estimate involved, was not clearly erroneous because "There is no mathematical formula for the determination of a reasonable royalty." 492 F(2d) at p. 1323.

Here the master found that the 0.75% royalty sought by plaintiffs in their industry-wide 1964 license offers was "too high"[43] largely because it had been rejected by every potential licensee. The master found that "plaintiffs were then on top", because the patent had then been validated and the Seventh Circuit noninfringement holding had not been made.[44] The master therefore rejected this unreasonable "too high" offer and turned to other evidence showing the economic value of the patented process as applied to bumpers. He then estimated the reasonable royalty figure by conducting the hypothetical negotiations approved by the Second Circuit in *Foster*. The end-result of these steps, he found, was a royalty rate of 0.50%, or two-thirds of the figure he had found to be "too high."[45]

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[43] fn. 26 p. 12, supra.

[44] fn. 25 p. 11, supra.

[45] fn. 27 p. 12, supra.

Although the District Court here confirmed the findings of the master, it inconsistently rejected his 0.50% reasonable royalty rate and adopted in its place the discredited and unreasonable 0.75% rate which was supported only by conjecture — not evidence.[46] Instead of asking 0.75% for a license in 1964, the plaintiffs could have requested 7.5% — or 75% — and the results would have been the same, every potential licensee would have rejected it. By the reasoning of the court below, such unconscionable royalty would nevertheless become the adjudicated reasonable royalty although it is nothing but conjecture.

A clear conflict exists between the ruling below that the 0.75% uniformly rejected figure is the reasonable royalty, and the ruling of the Second Circuit in the *Foster* case. In the Second Circuit, proposed but rejected licenses require the fact finder to turn to evidence rather than conjecture to ascertain the reasonable royalty. In the Third Circuit, the uniformly rejected figure may be conjectured as satisfactory proof of the reasonable royalty in place of the fact finder's contrary determination on the evidence.

This Court Should Articulate the Guidelines for Compliance with 35 USC 112 in Enforcing Judicially Modified Claims.

35 USC 112 requires patent claims "particularly pointing out and distinctly claiming" the invention. Claims, as issued, must "clearly circumscribe what is foreclosed from future enterprise." *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 236 (1942). The claims must identify the invention, not just the result achieved, and they cannot normally be saved by reading matter into them. *General Electric Co. v.*

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[46] fn. 28 p. 12, supra.

Wabash Appliance Corp., 304 U.S. 364, 374 (1938). The vast majority of this Court's rulings strictly adhere to the literal claim language, and treat claims like "the description in a deed, which sets the bounds to the grant which it contains." *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 510 (1917).

In *Graver Tank & Mfg. Co., Inc. v. Linde Air Products Co.*, 339 U.S. 605, 607-9 (1950), however, this Court instructed the lower courts to consider the "doctrine of equivalents" whenever literal patent claim infringement is not made out. To avoid "fraud on a patent" (339 U.S. at p. 608), that decision encourages the lower federal courts to broaden patent claims by departure from expressed language so as to cover more than what the literal words state. This Court also emphasized that claims may be similarly narrowed in relation to their literal scope by application of the "doctrine of equivalents." 339 U.S. at pp. 608-9. In *United States v. Adams,* 383 U.S. 39, 48-9 (1966), this Court sustained claim validity because of water activation described in the specification, even though the claims in question made no reference to water.

Judicially-created variations from literal patent claim language are now commonplace. As one Court of Appeals stated, ". . . seldom may the question be determined on the literal words of the claim. . . ."[47] Some cases involve only slight departure from claim language in the nature of interpretation. In other instances, such as the Seventh Circuit validity holding in this case, the claim is effectively rewritten by a major departure from the as-issued language.

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[47] *United States Industries v. Otis Eng. Corp.* 277 F(2d) 282, 287 (5th Cir., 1960).

Whether the deviation is small or large, the patent coverage is necessarily altered. Despite the importance of continued adherence to the statute, we are unaware of any case holding that the judicially modified claim must particularly point out and distinctly claim the invention. This is doubtless due to this Court's opinion in *Graver Tank v. Linde*, supra, which is silent on R.S. 4888 (now 35 USC 112).[48] Only the dissenting opinion of Justices Black and Douglas makes reference to the statute. 339 U.S. at pp. 613-4. This Court's opinion in *U.S. v. Adams, supra,* is likewise silent on the statutory requirement. A ruling in *Standard Industries v. Tigret Ind., Inc.*, 397 U.S. 586 (1970), might have articulated the statutory limitation, but was precluded by a four to four split in this Court.

This case shows what can happen when 35 USC 112 is ignored. The trial court here found the claim invalid over the prior art. But the Court of Appeals for the Seventh Circuit reconstructed the patent claim to distinguish the art and sustain validity in reliance on the showing that chemical coaction of soap, borax, and phosphate gave new results under certain process conditions. The coaction is not in the claim language, or even described in the specification, and applies only to particular conditions within the broad, otherwise invalid, claim scope.

Thereafter, the scope of Claim 4 could only be ascertained from the text of the Seventh Circuit opinion and plaintiffs' representations upon which it was based. The Seventh Circuit opinion stressed the borax coaction. Plaintiffs had represented it to be "essential to the successful operation of the process."[49] GM justifiably and in good faith treated the borax *coaction* as the touchstone and considered processes not having such coaction to be outside the patent claim, as reconstructed. This objective measure of patent scope enables infringement to be determined by tests or by chemical knowledge. The soundness of the GM position was confirmed by the Seventh Circuit *Houdaille* ruling in 1967, where that Court again stressed the borax coaction and held that successful usage of the bumper processes with a borax lubricant — but no showing of borax coaction — was insufficient to show infringement.[50]

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[48] Joint App., 2a.

Heeding the *Houdaille* noninfringement holding, plaintiffs attempted in the infringement trial of this case to prove the borax coaction with the soap and borax lubricants there involved. They failed.

The Court of Appeals for the Third Circuit has now cast aside the "law of the case" which was fixed by the Seventh Circuit to save patent validity. It has held infringement by borax bumper processes for which proofs of the borax coaction are nonexistent, or have failed.[51] On the neutralizing rinse processes only an unintentional and unknown amount of borax could have stayed on the work-piece.[52] But having discarded demonstrated borax coaction as an infringement proof requirement, the court had no way to distinguish the amount of borax and the process conditions that infringe and the amount of borax and process conditions that do not. Hence the holding of patent infringement despite the master's approved findings that the neutralizing rinses were old and were not intended to, and did not, bring about the end results of lubricity and cleanability that the court itself had previously relied upon.

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[49] fn. 4, p. 5, supra.

[50] fn. 13, p. 7, supra.

[51] Para. 43, Opn. Dec. 15, 1981 (Joint App., 324a).

[52] Section IIC2, Report of Special Master February 7, 1980 (Joint App., 191a).

When it considered the TKPP bumper processes, the court below relied upon this Court's *Graver Tank* opinion, supra[53], as well as other federal appellate decisions broadly sanctioning the application of equivalents to enlarge claims.[54] None of the opinions involved a patent previously held invalid over the prior art in the form issued by the Patent Office. None mentioned 35 USC 112.

Referring to these cases, but in violation of 35 USC 112, the court below applied "equivalents" without first requiring proof of the borax coaction and despite uncontested evidence that TKPP cannot undergo the same chemical reactions as borax. Were the claim, as written, so elastic that it could be read as limited to the unexpected borax coaction and therefore valid over the prior art, and at the same time be readable so as *not* to require such coaction on infringement, it would be invalid on its face for non-compliance with 35 USC 112. *General Electric Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 368 (1938). Moreover, the court's reliance solely upon similiarity of end-results — without considering whether both the means and the mode of operation are "substantially the same" — was a "flagrant abuse of the term 'equivalents'". *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 568 (1897). To the same effect is *Graver Tank v. Linde Air Prod.*, supra, at p. 608.

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[53] Para. 44, Opn. Dec. 15,1981 (Joint App., 324a).

[54] Para. 45-6, Opn. Dec. 15, 1981 (Joint App., 325a-327a).

Had this case remained in the Seventh Circuit for a determination of infringement, as did the *Houdaille* case, proof of the borax coaction would be required. Plaintiffs' failure to prove such coaction would have been fatal. But this case was transferred, and the conflicting view of the Third Circuit has led to a double standard and a miscarriage of justice.

There is an urgent need for a ruling by this Court that judicial interpretation and application of patent claims must comply with 35 USC 112. Specifically, this Court should grant the writ and, on the undisputed evidence and found facts in this case, rule that:

> 1. The claim as validated by the narrow and restricted construction applied by the Seventh Circuit cannot now be expanded by the doctrine of equivalents to cover the TKPP lubricants. Cf: *Exhibit Supply Co. v. Ace Patents Corp.*, 315 U.S. 126, 136 (1941).
>
> 2. Borax neutralizers used to neutralize and not to improve lubricity or cleanability, and not having such effect, cannot infringe the claim as narrowed to save validity.
>
> 3. The claim as validated because of the borax coaction cannot be infringed by any process not shown to achieve the borax coaction.

Such holdings will properly caution the lower courts against misinterpreting this Court's silence on 35 USC 112 in *Graver Tank v. Linde*, supra, and *U.S. v. Adams*, supra, and assure adherence to the statute at all times.

CONCLUSION

For the reasons stated, this Petition for Certiorari should be granted.

Respectfully submitted,

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March 9, 1982

EXHIBIT I

The following information is provided by General Motors Corporation pursuant to Supreme Court Rule 28.1: All U.S. and Canadian subsidiaries of General Motors Corporation are wholly owned with the exception of Motor Enterprises, Inc., which is partly owned by the U.S. Small Business Administration.

Foreign subsidiaries in which a private person could have a financial interest are as follows:

1. Fabrica Colombiana de Automotores S.A.
2. Gemeinnutzige Opel Wohnbaugesellschaft Mit Beschrankter Haftung
3. General Motors Acceptance Corporation, Nederland N.V.
4. General Motors de Colombia S.A.
5. General Motors Iran Limited
6. General Motors Kenya Limited Industrial Commercial Development Corporation
7. General Motors Korea Co., Ltd.
8. General Motors Pilipinas, Inc.
9. GM Allison Japan Limited
10. Industrija Delova Automobila, Kikinda
11. Isuzu Motors Limited
12. Isuzu Motors Finance Co., Ltd.
13. Saudi American Machinery Maintenance Company (SAMMCO)

14. Packard Electric Ireland Limited
15. RADIO FIDUCIAIRE, S.A.
16. Saehan Motor Company, Limited
17. Transfin (Proprietary) Limited

Some of the processes accused as infringements were performed by Defendant using materials purchased under indemnity agreements with one or more of the following:

1. Amchem Products, Inc.
2. Bethlehem Steel Corporation
3. Braun Engineering Company
4. Colt Industries, Inc.
5. LTV Corporation
6. National Steel Corporation
7. Occidental Petroleum Corporation
8. Pennwalt Corporation
9. Republic Steel Corporation
10. United States Steel Corporation

Joint Appendix

1

Office - Supreme Court, U.S.
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JUL 10 1982
ALEXANDER L. STEVAS,

No. 81-1661

In the Supreme Court of the United States

OCTOBER TERM, 1982

GENERAL MOTORS CORPORATION,
Petitioner,

vs.

DEVEX CORPORATION, ET AL.,
Respondents.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

JOINT APPENDIX — VOLUME I

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UNITED STATES CODE
TITLE 35 — PATENTS

* * *

§ 112. Specification

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or dependent form, and if in dependent form, it shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. (Amended July 24, 1965, Public Law 89-83, sec. 9, 79 Stat. 261.)

* * *

§ 284. Damages

Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed.

The court may receive expert testimony as an aid to the determination of damages or of what royalty would be reasonable under the circumstances.

Patent Statutes as Repealed and Codified by Act of July 19, 1952 (66 Stat. 792)

Before any inventor or discoverer shall receive a patent for his invention or discovery, he shall make application therefor, in writing to the Commissioner of Patents, and shall file in the Patent-Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim, the part, improvement, or combination which he claims as his invention or discovery. (Section 4888, R.S.)

The several courts vested with jurisdiction of cases arising under the patent laws shall have power to grant injunctions according to the course and principles of courts of equity, to prevent the violation of any right secured by patent, on such terms as the court may deem reasonable; and upon a judgment being rendered in any case for an infringement the complainant shall be entitled to recover general damages which shall be due compensation for making, using, or selling the invention, not less than a reasonable royalty therefor, together with such costs, and interest, as may be fixed by the court. The court may in its discretion award reasonable attorney's fees to the prevailing party upon the entry of judgment on any patent case. (Section 4921, R.S., as amended by Act of Aug. 1, 1946, 60 Stat. 778.)

CONSOLIDATED CASES

Devex Corp. *v.* Houdaille Industries, No. 57 C 892
Devex Corp. *v.* General Motors Corp., No. 56 C 1912
(Judge Edwin A. Robson, N.D. Illinois, February 1, 1962)

DECISION ON MERITS ON VALIDITY OF CLAIM 4 OF REISSUE NO. 24,017.

An order of November 19, 1949, in these two causes, consolidated for trial, the common issue of validity[1] of Claim 4 of Reissue Patent No. 24,017 to John A. Henricks, reissued June 7, 1955, on original Patent No. 2,588,234, dated March 4, 1952, on application filed October 31, 1950.[2]

Suit No. 56 C 1912 was filed November 13, 1956, and [369] No. 57 C 892 on May 17, 1957. The patent concerns a "Method of Coating and Drawing Metal and Composition Therefor." Claim 4 thereof is as follows:

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[1] But not otherwise.

[2] On April 29, 1946, Henricks had filed patent application No. 665,905, which was abandoned.

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

The patent was assigned to plaintiffs in 1955.

It is the Court's conclusion that Claim 4 of the reissue patent is invalid as anticipated by prior patents, prior use, and prior publications. The United States patents to Singer, Orozco and Whitbeck, the British patents, the 1943 runs at Briggs Manufacturing Company, and the German publications considered together reveal the phosphate coatings on metals to be drawn, in conjunction with lubricants, some co-acting with the phosphate coating. While it is arguable that the precise combination and co-action indicated by the patent are not found verbatim in the prior art, one armed with the knowledge of a worker skilled in that field could, the Court believes, have achieved the result covered by Claim 4 of the reissue patent. Furthermore, the breadth and indefiniteness of proportions of the elements of that claim[3] preclude a holding of its validity in view of the knowledgeable prior art,[4] in [370] view of the disclosures of the specifications, and unwarranted monopolizing of the field of use of borax and soap.[5]

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[3] The specifications state that borax is to be used in the portions of *two to five times the amount of soap*.

[4] There is no specification, disclosure or limitation in Claim 4 of the amount or proportions of solid inorganic compound (borax) or solid meltable organic binding material (soap).

Plaintiffs state the invention is concerned with the lubrication of metal surfaces under the extreme conditions encountered in the drawing and deforming of metals which are difficult to work, such as steel. They rely, as is to be expected, upon the statutory presumption of validity (35 U. S. C. §282), especially as buttressed by the issuance of the patent over similarly cited prior art[6] and because the facts supportive of validity are gleaned from defendants' witnesses.[7] Defendants, however, assert this presumption is of no avail because "the true state of the prior art was not considered by the Patent Office."[8] It is explained that in the drawing of metal to transform a flat blank into another desired shape, there is necessarily some relative movement between the surface of the workpiece and the surface of the die, and a generation of high pressures and temperatures. Unless suitable provision for lubricating the surfaces is made, tearing of the metal or galling of the dies results, and the problem, plaintiffs state, is most acute where difficult draws of ferrous metal are involved. The prior art revealed the use of various lubricating schemes including ordinary lubricating oils [371] or lubricants containing infusible pigments, such as clay, lime, mica or graphite — "wet film" lubricants, not fixed on the surface of the workpiece during the drawing operation. The function of the infusible pigments was to separate the die and the workpiece at the points of extreme deformation to prevent the squeezing-out of the lubricants, and simultaneously to act as a sponge for the lubricants. Although the functioning of the pigmented compositions was better than the others, the result was not too desirable in that minute particles of the pigments became embedded in the work drawn leaving it with a dull finish. Patentee, plaintiffs claim, requires a fixed soap-and-borax film, not just any ordinary wet film or grease lubricant.

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[5] *O'Reilly, et al. v. Morse, et al.*, 56 U.S. 65 (1853); *Holland Furniture Company v. Perkins Glue Company*, 277 U.S. 245 (1928); *The Incandescent Lamp Patent,* 159 U.S. 465 (1895); *General Electric Co. v. Wabash Appliance Corp., et al.*, 304 U.S. 364 (1938); *United Carbon v. Binney & Smith Co.*, 317 U.S. 228 (1942).

[6] *Anderson Company v. Sears Roebuck and Co., et al.*, 265 F. 2d 755 (7th Cir., 1957); *The University of Illinois Foundation v. Block Drug Co., et al.*, 241 F. 2d 6 (7th Cir. 1957).

[7] *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45, 53 (1923).

[8] *Moran, et al., v. Protective Equipment, Inc., et al.* 84 F. 2d 927 (7th Cir. 1936); *Hobbs v. Wisconsin Power & Light Co., et al.*, 250 F. 2d 100 (7th Cir. 1957).

It is defendants'[9] contention that Claim 4 is invalid because (1) of lack of patentable invention in view of the prior art known and practiced on April 29, 1946, the date of the abandoned application; (2) the process was known and used by others before the date of invention; (3) the patentee did not invent the process but simply adopted a process which was obvious to persons skilled in the art; (4) it is an aggregation of old steps which when com- [372] bined produces no new result;[10] (5) it is beyond the disclosure of the specifications; (6) it fails

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[9] Defendant Houdaille adopted defendant General Motors Corporation's reply brief and filed no "separate brief."

[10] Phosphate coatings were known to be improvement and aid in drawing and deforming operations and would increase life of drawing tools and reduce number of drawing operations (British patents Nos. 494, 830 (1938), 496, 866 (1938), 1941 publication Korrosion and Metallwirtschaft, 1938 U.S. Singer patent No. 2,105,015), and that they would provide a barrier to prevent scoring of metal being drawn or galling of dies. Defendants cite *Great Atlantic & Pacific Tea Co. v. Supermarket*

continued on next page

to specify amounts and proportions of ingredients;[11] (7) it covers prior art materials of soap and borax not disclosed in the specifications, which materials are used contrary to the purposes patentee contemplated.

[373] Defendants contend that a patentee may not compel independent experimentation by others to ascertain the bounds of the claims[12] and a patentee may not be claiming a method broadly in terms of a result or function, foreclose all means and ways of practically obtaining such result or objective.[13] Substitution of one material for another of the same class in an old combination does not constitute invention.[14]

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continued from previous page

Equipment Corp., 340 U.S. 147 (1950); *Hollister, Collector v. Benedict & Burnham Manufacturing Company,* 113 U.S. 59 (1885); *Atlantic Works v. Brady,* 107 U.S. 192 (1882); *Smith v. Nichols,* 88 U.S. 112 (1874), *Hotchkill, et al. v. Greenwood, et al.*, 11 Howard 248; *Armour & Co. v. Wilson & Co., Inc.*, 274 F. 2d 143 (7th Cir. 1960); *Armour Research Foundation, etc. et al. v. C.K. Williams & Co., Inc.*, 280 F. 2d 499 (7th Cir. 1960); *Dow Chemical Co. v. Halliburton Oil Well Cementing Co.*, 324 U.S. 320 (1945); *Jungersen v. Ostby & Barton Co., et al.*, 335 U.S. 560 (1949); *Emery Industries, Inc. v. Schumann, et al.*, 111 F. 2d 209 (7th Cir. 1940); *Himmel Bros. Co. v. Serrick Corporation,* 122 F. 2d 740 (7th Cir. 1941).

[11] 35 U.S.C. § 112; *Johns-Manville Corporation v. Johnson & Co. v. Hillman's,* 135 F. 2d 955 (7th Cir. 1943); *Fruit Treating Corporation, et al. v. Food Machinery Corporation,* 112 F. 2d 119 (5th Cir. 1940); *The Incandescent Lamp Patent,* 159 U.S. 465 (1895); *General Electric Co. v. Wabash Appliance Corp., et al.*, 304 U.S. 364 (1938); *United Carbon Co., et al. v. Binney & Smith Co.*, 317 U.S. 228 (1942); *Graver Tank & Mfg. Co. Inc., et al. v. Linde Air Products Co.*, 336 U.S. 271 (1949).

[12] *Standard Oil Company of California v. Tide Water Associated Oil Co.*, 154 F. 2d 579 (3rd Cir. 1946).

[13] *National Carbon Co., Inc. v. Western Shade Cloth Co.*, 93 F. 2d 94 (7th Cir. 1937).

[14] *Johnson Laboratories, Inc. v. Meissner,* 98 F. 2d 937 (7th Cir. 1938).

That broadness of a claim such as Claim 4, defendants assert, has long been condemned.[15]

On the other hand, patentable invention is claimed by plaintiffs in that it is asserted that Henricks' patented process, although using old elements, achieves new and surprising results, or, stated differently, the whole exceeds the sum of the parts.[16]

[374] They frankly concede that all the elements of the Henricks' invention were old, but urge they were put together in a new way, resulting in new and unpredictable results and reactions. They emphasize that Claim 4 uses a phosphate coating (the abrasive coating of the Singer process), seemingly a retrogression in the art; a *fixed* overlying film of which the solid meltable inorganic consistent is soap and a meltable inorganic compound (Borax) distributed therethrough, meltable at a temperature below the melting point of the abrasive phosphate coating and having a hardness not more than 5 on the Mohs' scale.

The "amazingly efficient" and "remarkable" results claimed by plaintiffs from the Henricks' patented process is that "the surface of the product is improved, product dimensions are maintained with consistency, tool life is lengthened, and the practical limits of the shaping operation are extended." Further, the "formation of insoluble or difficultly-soluble deposits on the drawn metal is inhibited, such as zinc stearate. Instead of the phosphate coating reacting with the soap to form insoluble abrasive compounds, the phosphate reacts with the borax to form amorphous, glassy materials which contribute significantly to the lubricating value of the coating and assist in the drawing operation and yet, amazingly do not present any problem of cleaning." The process results in articles of "superior quality at lower cost." Defendants, on the other hand, deny any unexpected or surprising co-action or results by the use of soap-borax lubricants over phosphate. They note that there is no substantial difference in the rods introduced in evidence, drawn only with phosphate coating and with soap, and with soap and borax.

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[15] *O'Reilly, et al. v. Morse, et al.*, 56 U.S. 61 (1853); *Holland Furniture Company v. Perkins Glue Company,* 277 U.S. 245 (1928); *The Incandescent Lamp Patent,* 159 U.S. 465 (1895); *General Electric Co. v. Wabash Appliance Corp., et al.*, 304 U.S. 364 (1938); *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228 (1924).

[16] *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147 (1950); *Lewyt Corporation v. Health-Mor, Inc., et al.*, 181 F. 2d 855 (7th Cir. 1950); *Blaw-Knox Company v. I.D. Lain Company, Inc.*, 230 F. 2d 373 (7th Cir. 1956); *The Mojonnier Dawson Company v. U.S. Dairies Sales Corporation,* 251 F. 2d 345 (7th Cir. 1958); *Armour & Co. v. Wilson & Co., Inc.*, 274 2d 143 (7th Cir. 1960); *Donner v. Sheer Pharmacal Corporation,* 64 F. 2d 217 (8th Cir. 1933).

[375] Plaintiffs adduced expert testimony of X-ray diffraction analyses asserted to prove the glassiness of the worked surface. Defendants belittle the X-ray diffraction tests, as not identifying with any certainty the quantitative values or amounts of the compounds alleged to have been formed by the chemical reaction of the borax, or that they were present in any substantial quantity or had any controlling or significant effect in the drawing operations to which the sample rods were subjected.

Plaintiffs contend that the prior art other than that cited before the Patent Office is without weight as not disclosing anything not covered by the prior art that was before the Patent Office, and therefore is not significant as not disclosing anything substantial not considered by the Patent Office.[17] They readily acknowledge prior art use of soap and borax dry film lubrication over bare metal, patentee having so stated in the specifications of the patent in suit. They confidently point to the fact that defendants relied on thirty-one references at the trial, which plaintiffs deign a per se indication that there is no single anticipating reference, and the fact that so many references were cited means that none of them anticipates.[18] Plaintiffs further maintain that defendants have the burden of proving invalidity on the ground of prior public use, which must be established beyond a reasonable doubt,[19] and oral [376] testimony unsupported by contemporaneous documentary or physical evidence is not enough.[20] They dispatch with alacrity the alleged prior public uses as having been very brief episodes during World War II, and none of the presently accused processes stems from those uses, and "Whatever was done in those plants was history — long since dead and buried and resurrected only for the defense of this case."

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[17] *Otto v. Koppers Company, Inc.*, 246 F. 2d 789, 801 (4th Cir. 1957).

Defendants point out that the Patent Office did not have before it at the time of the issuance of the Henricks' patent, the Singer patent, the Orozco patent No. 1,982,065, or the British patent No. 494,830, or several material publications.[21] The Patent Office was not advised that lubricated phosphate coatings were in common public use in 1943 in drawing metal; or that Gilron Products Company's Drawcote soap-borax lubricants disclosed in the Orozco No. 2,469,473 and Henricks No. 2,530,837 patents, and Whitbeck patent No. 2,470,062 were in common public use in 1943. The Orozco patent attributes the lengthening of die life[22] to the use of soap-borax lubricants which were in public use in 1943.

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[18] *Ric-Wil Co. v. E.B. Kaiser Co.*, 179 F. 2d 401, 404 (7th Cir. 1950), cert. den. 329 U.S. 958.

[19] *Coffin v. Ogden*, 85 U.S. 120 (1874); *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45 (1923); *Smith v. Hall*, 301 U.S. 216 (1937).

[20] *Miner v. T.H. Symington Company*, 250 U.S. 383 (1919); *Smith v. Hall*, 301 U.S. 216 (1937); *Cline Electric Mfg. Co. v. Kohler*, 27 F. 2d 638; *Cold Metal Products Company v. E.W. Bliss Company*, 285 F. 2d 244 (1960).

[21] Transactions of American Society for Steel Treating, 1933; Wire & Wire Products, October, 1931; Korrosion & Metallschutz, 1941; Metallwirtschaft, 1942; Stahl and Eisen, 1942.

The Singer patent No. 2,105,015,[23] issued January 11, 1938, on application of May 14, 1936, pertained to "Mechanically Working Metal Article," having for its [377] object the reduction or elimination of difficulties theretofore encountered through contact of the metal article and the working tool, particularly in the field of ferrous metals, specifically, steel, where drawing dies were found to tend to bite into or seize the metal, thereby interfering with the proper drawing or reducing operation. It is noted by plaintiffs that theretofore lubricants, principally oil, had been utilized, but were found insufficient at high speed or high deformation rates. They further cite the advantages and disadvantages of the art of liming or soft metal coatings which had been used. The patent disclosed that the difficulties could be materially reduced or overcome by providing the surface, of the article worked on, with a "thin crystalline coherent coating of a metallic oxide or salt, with crystals of which are in heterogeneous crystalline joint with the metal base and are tightly grown together with the latter. ***" It disclosed that while the coating could be considered a lubricant, it was not a lubricant in the ordinary sense for the reason that the present methods of lubrication "*may also be used in conjunction* with the practice of the present process, and in many instances will be an essential factor in obtaining proper results." (Emphasis ours).

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[22] Stated in the patent to be thirty per cent.

[23] Not before the Patent Office as prior art, but defendants state that British Patent No. 496,866 was cited and it discloses a process similar to the Singer process.

This Singer patent recommends the use for treating "coatings of iron or complex iron phosphates or oxalates." "There is formed on the article a dense thin crystalline coherent and tightly adherent coating of salts of phosphoric or oxalic acid which combines both chemically and physically with the metal of the base." Singer further states that "such a coating adapts the article admirable to [378] mechanically working and reduces or eliminates the troubles arising from the contact of the article with the working element." He also specifies that "In many instances no further removal of the coating is necessary after working, either because it has been substantially removed during the working operation or that portion which remains does not interfere with the use to which the article is subsequently applied."

Defendants point out that the 1938 Singer patent is specifically directed to the process of drawing steel, to the use of phosphate coatings, to prevent metal-to-tool contact in the drawing process, and recommends that the phosphate coatings be lubricated with known methods of lubrication, which process permits severe reduction rates. They further maintain all patentee did was follow Singer's teachings exactly, using well-known prior art methods of lubrication, Gilron soap-borax, to Singer's phosphate coating.

Plaintiffs differentiate Singer's contribution as forming a sponge-like coating on the surface of the workpiece, the coating being adherent to it and not displaceable and necessarily moving with the surface of the workpiece into the high pressure zone, and being sponge-like would carry lubricant with it. The sponge of Singer was a metallic phosphate of zinc or iron. Plaintiffs state the phosphate coatings were old and had no lubricating value per se, but on the contrary were abrasive. The limitations of the Singer process were that it left an oily film upon the surface of the workpiece which film was difficult and expensive to remove, especially where electroplating was contemplated, which required a clean surface. Plaintiffs [379] contend that Singer nowhere teaches or suggests the use over phosphate of a *fixed* film comprising an organic binding material with meltable inorganic compounds distributed through it, such as soap and borax, and so clearly does not anticipate Claim 4.

It is defendants' contention that patentee knew in 1943[24] that Gilron Drawcote soap-borax lubricants could be used over phosphate coatings in accordance with Singer's teachings but it was to Whitbeck's interest to promote the sale of Drawcote at the better price he could obtain if used without the phosphate coating. If any superiority arises in the use of the Gilron Products it is due to the patented features of the Orozco patents 2,469,473 and 2,530,837, and Whitbeck patent 2,470,062, and the instant patent is but an effort to repatent the Singer process and the patented Gilron soap-borax lubricants.

Another of the cited prior art is U.S. Patent No. 2,469,473 to Orozco and Henricks, dated May 10, 1949,[25] on a "Method of Lubricating Metal Surfaces During Cold Working." The patented invention utilizes a planned succession of endothermic reactions initiated by the frictional heat that not only cools the frictional surfaces by absorbing heat but which produces nascent fluid lubricants at points of extreme heat and pressure. "The preferred procedure uses both fusible organic and fusible inorganic mate- [380] rials to produce such succession of reactions." This patent further stated that it

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[24] Henricks assisted Whitbeck, his employer, at the Briggs Company.

[25] Applied for in 1943.

> "utilized inorganic compounds to achieve the essential cooling and lubrication of the 'sliding' surfaces at the elevated temperatures existing when combustible organic lubricants are ordinarily no longer capable of functioning; but, in addition, we utilize properties of the inorganic materials to increase the thermal stability of the preferred organic lubricants used."

Defendants cite this patent as disclosing increased die life from the use of prior art Gilron Products' soap-borax lubricants. They cite Orozco Patent No. 1,982,065 of November 27, 1934, as showing that it was known that soap and borax were a good lubricant for use in deforming steel by cold rolling to prevent sticking of the work and prevent scarfing of the work.

The 1938 British Patent No. 494,830 was not considered by the Patent Office. Defendants claim that this patent discloses in all essential respects the process broadly claimed by Claim 4 of the patent in suit. This British patent taught the treating of iron pipes, prior to drawing, with fats or oils, or to precipitate deposits thereon in order to soften the surface and to reduce the wear on the drawing tools. It stated that it also has been "the practice to mix the oil or fat with pulverulent substances, such as talc or litharge, for the purpose of increasing its efficiency." Defendants point out that fats are known to include tallows which are solid at room temperature; that tallows are one of the oldest and most extensively used ingredients in drawing compounds, and it was known to mix drawing compounds with fillers including borax. They also state that borax, aluminum stearate and litharge are within the classification of the "solid inorganic com- [381] pound" in Claim 4, that each has a melting point below that of ferrous phosphate; and each has a hardness not exceeding 5 on the Mohs' hardness scale. All are recommended in the patent in suit as solid inorganic compounds to be included in the "solid meltable organic binding materials," which is claimed and alleged in the patent in suit to include sodium stearate or sodium tallow soap.

The British patent further states that

> "in place of using lubricants, to provide the surface of the iron, *** by means of a phosphate treatment, with a crystalline skin of oxides or salts, the crystals of which coalesced firmly with the foundations, such crystals being intended to lessen the wear on the drawing dies."

It further states:

> "[T]he layers applied by specific surface-treatment processes exhibit a porous, absorbent structure, and that the combination of such a surface treatment with a lubricating oil or fat, furnishes favorable results. *** [S]uch chemical processes as are capable of depositing a crystalline layer possessing active capillary properties on the surface of the workpiece and coalescing firmly with the foundation, said crystalline layer being also adapted, by reason of its absorbent capacity, to retain oils and fats. The phosphatising processes, and also the known treatment with oxalates and tannates, are specifically suitable for iron and steel."

The three prior public uses relied upon are (1) at the Briggs Body Company plant at Detroit; (2) the Buick Motor Company plant at Flint, and (3) the Northern Engraving Company plant at LaCrosse. Plaintiffs claim that the processes used were phosphate coating applied to shell casing blanks on which were applied wet film lubricants, in accordance with the Singer process. The wet film lubricant was abandoned, plaintiffs state, and the dry film soap and borax system substituted for it to eliminate the phosphate. The phosphate coating compounds were sup- [382] plied by Parker Rust Proof Company. Plaintiffs cite the fact that no field reports were produced for two of the three purported public uses which they interpret as indicative that if produced they would have refuted and not aided the defense.[26] These uses, if existent at all, plaintiffs claim, were so fleeting as to be of no legal significance, "accidental results, not intended and not appreciated" and not constituting anticipation.[27]

Defendants, however, refute the weight to be accorded to the lack of field reports on the ground Parker Rust Proof Company in 1943 was not concerned with particular lubricants used over phosphates, and was not so interested until 1949 when it entered upon the development of Bonderlube 235.

Plaintiffs' version of the Briggs Body Company's prior use is that it was done at the beginning of experimental testing in changing over from the Singer process to Gilron, and amounted to less than two hundred blanks which had a soap and borax coating over the phosphate, the blanks having been subjected to six consecutive forming operations. These blanks were lost track of in the big flow of material. The incident is said to have no technical or commercial significance, and is not an invalidating prior use.[28] Plaintiffs further point out that at the Briggs' [383] plant the phosphate tank was emptied and refilled with Gilron material so that the tank was no longer available for phosphating, and there never could have been a simultaneous use of Gilron over phosphate.

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[26] *H. Mueller Mfg. Co. v. Glauber*, 184 Fed. 609 (7th Cir. 1910); *Mammoth Oil Co. v. United States*, 275 U.S. 13 (1927).

[27] *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45, 66 (1923).

[28] *Miner v. T.H. Symington Company*, 250 U.S. 383 (1919); *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45, 53 (1923).

Defendants, on the contrary, claim that these operations at Briggs were not limited to a few baskets of shells but that there continued to be drawn through the summer, shells with phosphate coatings applied, and with the Gilron Drawcote. They stressed the fact that full knowledge of successful runs at the Briggs plant was had by patentee, Whitbeck (superior of patentee at Briggs Company), Tousley, and Gilron Company, and that proof of the knowledge was sufficient under the law[29] and the use was neither embryonic nor incomplete. Defendants also maintain the proof of prior use may be by parol testimony.[30]

In scotching as anticipatory the purported prior use at the Buick plant, plaintiffs point out that a wet film lubricant with scratchy, infusible pigments was employed as opposed to the fixed film with meltable inorganic compounds of Claim 4. There was said to be no fixed film organic binder and no solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate, or that the drawing compound used at Buick formed a fixed film over the phosphate or was anything other than a conventional wet film lubricant. There is no certainty of proof that sulphur was used, but even if it were used it is an element and not an inorganic compound within Claim 4.

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[29] *Coffin v. Ogden*, 85 U.S. 120 (1873).

[30] *Coffin v. Ogden, supra; Becker v. Electric Service Supplies Co.*, 98 F. 2d 366 (7th Cir. 1938); *Hobbs Patent Co. v. Atlas Specialty Mfg. Co.*, 244 Fed. 176 (7th Cir. 1917); *Kaser Process Pie Co., et al. v. Pie Bakeries of America, Inc.*, 50 F. 2d 414 (D.C. Ill. 1931).

[384] Defendants claim, however, the Buick plant was in large production of steel shell cases using lubricated phosphate coatings.

Plaintiffs also eschew the activities at Northern Engraving as a prior use on the basis that there was no fixed film used there and no meltable inorganic compounds in it. The Ferrolube used was not dry but plastic; in the drawing operation it was wiped off. Further, plaintiffs claim that inasmuch as the cost of the constituents of Ferrolube — stearic acid, sodium stearate, and sulphur — substantially exceed the price of Ferrolube, the story concerning Ferrolube is wholly incredible.

Defendants contend, on the other hand, this Company was in large production of lubricated phosphate castings, and that while Ferrolube[31] was not a fixed film and had no meltable inorganic compound in it, it did provide a film which stayed fixed with the phosphate coating through the drawing operation where both were substantially removed; it was a successful drawing lubricant and operation. Defendants note Claim 4 only requires that the film remain fixed with the phosphate coating in the drawing operation.

Defendants cite the publication, Wire & Wire Products, of October, 1931, as showing that tallow soap combined with aluminum stearate was a good drawing lubricant. They cite the June, 1941, publication of Korrosion & Mettalschutz as disclosing the use of zinc phosphate coatings in cold forming, lubricated with boring oil emulsion, as lengthening the life of drawing tools, reducing friction in the [385] forming process, increasing the reduction and drawing speeds, and reducing the number of drawing operations; the 1942 publications of Mettalwirtschaft and Stahl und Eisen as also teaching zinc phosphate coatings, lubricated with soap thereby providing water insoluble soap films on the coatings. Defendants point out that nothing was said in the patent in suit about increasing the die life or the life of the drawing tools with the soap-borax lubricants applied over phosphate coatings.

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[31] There was a dispute raised by plaintiffs over the contents of Ferrolube asserting that according to the cost of the constituents it was being sold for less than cost price but defendants point out that much of the contents was water, thus reducing the product cost per pound.

The plantiffs state of the prior art development of the "Gilron" dry run film lubricant (called Drawcote) that it was a reversion to the early idea of using a finely divided solid material as a lubricant which was applied wet and permitted to dry out to a dry fixed film. One of the formulas consisted of soap and borax. The dry soap film formed on the workpiece served as a carrier for the borax somewhat analogous to the phosphate coating in the Singer process, except that the soap film had inherent lubricating value, and did away with the abrasive phosphate coating of the Singer process. When a soap film was used instead of the lubricating oil contemplated by Singer, the problem of residual deposit on the surface of the workpiece remained. The soap film when first applied was water soluble but after drawing was insoluble, because the soap was one made of animal fat, which chemically is sodium stearate, and when placed over a zinc phosphate coating and the work drawn, a chemical reaction results in the formation of zinc stearate, which is also a soap but a water-insoluble one, difficult to remove even with alkaline cleansing agents.

[386] Defendants cite as well known in 1943, more than two years prior to April 29, 1946, the date of the original application, the processes of drawing lubricants including tallow and tallow soaps with fillers or pigments including borax, aluminum stearate and litharge, compounds meltable below the melting point of ferrous phosphate and having a hardness not exceeding 5 on the Mohs' hardness scale; iron, zinc and manganese phosphate coatings lubricated with known

lubricants, or with soap, providing water insoluble soap films; Gilron Drawcote soap-borax fixed film drawing lubricants were known and in wide public use, and it was known it could be used successfully on zinc phosphate coated steel.

Plaintiffs, however, understandably argue that the fact that defendants follow the teachings of the patent in suit rather than the prior art is indicative of the presence of invention.[32]

It is plaintiffs' position that Henricks' invention was not obvious, as is manifested by the number of citations of anticipating patents and uses;[33] the unobviousness of Henricks' invention is shown by the history of Parker Rust Proof Company, a leader in the field. In 1949, it had decided to manufacture lubricating compounds for use over phosphate. It made a search of the literature which should have furnished them knowledge of the wet film lubricants for use with the Singer process and the dry film soap and borax lubricants, exemplified by Whitbeck [387] U.S. Patent No. 2,470,062. Plaintiffs point out that "Parker Rust Proof had spent thousands of dollars and years of effort to arrive at the results which Henricks had intuitively reached years beforehand. The personnel at Parker Rust Proof had far more than ordinary skill in the art and yet the invention of the Henricks' patent was not obvious." Plaintiffs also note that Parker Rust Proof is holding General Motors Corporation harmless as to all phosphate coating materials and lubricating compositions purchased from it.

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[32] *Goodyear Tire & Rubber Co., Inc., el al.* v. *Ray-O-Vac Company*, 321 U.S. 275 (1944), affg. 136 F.2d 159 (7th Cir. 1943); similarly *William A. Murray Spring Co.* v. *Fort Pitt Bedding Co.*, 23 F.2d 559 (3rd Cir. 1928); *Kurtz, et. al.* v. *Beel Hat Lining Co., Inc.*, 280 Fed. 277 (2nd Cir. 1922).

[33] *Ric-Wil Co.* v. *E.B. Kaiser Co.*, 179 F.2d 401 (7th Cir. 1950); *Hoeltk* v. *C. M. Kemp Mfg. Co.*, 80 F.2d 912 (4th Cir. 1935).

Defendants on the other hand, say patentee adopted an obvious, analogous and previously known use for soap borax[34] and that Parker Rust Proof Company must have had knowledge of the soap borax dry film system. After much experimentation, they had the idea of using a soap and borax dry film lubricant over phosphate, the "Bonderlube series." Defendants point out that the patent says nothing about increasing the die life with soap-borax lubricants applied over phosphate coatings. Furthermore, inventors are conclusively presumed to know the prior art,[35] and that it took no invention to achieve the patented process but only ordinary skill, with all the prior art and knowledge before him, to apply the Gilron soap-borax lubricants to phosphate coated steel. Defendants further maintain the presumption of validity of an issued patent falls where the true state of the prior art was not [388] considered by the Patent Office.[36]

Defendants dispute the history of "Bonderlube" as being evidence of the unobviousness of the alleged patented invention, and on the contrary assert it demonstrates the invalidity of Claim 4. They cite the pamphlets "Bonderite as an Aid in Cold Forming" and "Bonderite and Bonderlube as Aids in Cold Forming," of Parker Rust Proof Company, stating the Bonderite coating (a phosphate coating) integral with the metal surface reacts with the lubricating solution (Bonderlube) to form a water-insoluble soap which in itself becomes an integral part of the Bonderite coating. The 1942 publication, Metallwirtschaft, stated similarly. Their expert, Dr. Gibson, stated Bonderlube 235 was derived from the German practice, described in the 1942 publication, Mettallwirtschaft, of providing a water insoluble soap film on the phosphate coating to serve as the lubricant, by long soaking. Parker Rust Proof Company developed a similar coating more speedily by including a small amount of borax, approximately three percent of the soap, to control the pH (the acidity or alkalinity), thereby obtaining the formation of the water insoluble soap (zinc stearate) as an integral part of the phosphate coating, in a few minutes. Defendants contend the small amount of borax provides its long-known buffering function, which controls and maintains the aqueous soap solution within the narrow range of alkalinity that enables the water insoluble soap (zinc stearate) to form quickly on and with the zinc of the phos- [389] phate coating. They maintain that this is a use for borax which is neither suggested nor contemplated by the patent in suit, which rather contemplates the use of a large amount of borax to act as a meltable pigment to provide a glass-like lubricant.

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[34] Similarly to the patentee's position in *Armour & Co. v. Wilson & Co., Inc.*, 274 F. 2d 143 (7th Cir. 1960).

[35] *Zephyr American Corporation v. Bates Mfg. Co., et al.*, 128 F. 2d 380 (3rd Cir. 1942); *Adams, et al. v. Galion Iron Works & Mfg. Co.*, 42 F. 2d 395 (6th Cir. 1930); *Allied Wheel Products, Inc. v. Rude*, 206 F. 2d 752 (6th Cir. 1953); *Application of Thayer*, 143 F. 2d 996 (C.C.P.A. 1944); *Applications of Adams and Free*, 284 F. 2d 525 (C.C.P.A. 1960); *General Time Corp. v. Hansen Mfg. Co.*, 199 F. 2d 259 (7th Cir. 1952).

[36] *Moran, et al. v. Protective Equipment, Inc., et al.*, 84 F. 2d 927 (7th Cir. 1936); *Hobbs v. Wisconsin Power & Light Company*, 250 F. 2d 100 (7th Cir. 1957).

Defendants state that Henricks, in his testimony, resorted to guessing and speculation respecting the amount of borax required for the Claim 4 process when soap borax lubricants are used over phosphate coatings, requiring an amount of borax sufficient to prevent formation of water insoluble soap; he was quoting the general cosmetic formulary of 1-5%, which amount is sufficient to prevent the insoluble soap, such as zinc stearate, from forming, but if it does form, the borax emulsifies it, cleansing it. His claimed invention was to prevent the formation of the water insoluble soap film, not for the contrary purpose of providing the insoluble soap film integral with the phosphate coating as the principal and chief lubricating agent. In Bonderlube 235, the small amount of borax, approximately three percent, the defendants cite as providing a buffer in the aqueous soap solution for the purpose of controlling the alkalinity of that solution within the range that promotes the forming of the water insoluble soap, zinc stearate, as an integral part of the phosphate coating, which is not disclosed by the patent, and contrary to Henricks' testimony. Bonderlube 235, developed prior to 1951, was prior to the issuance of either the original patent in 1952, or the reissue in 1955, making it further clear that the history of Bonderlube 235 does not afford proof that the patent achieved the unobvious.

The Court has no doubt whatsoever that Henricks' testimony respecting the amount of borax required in the [390] patented process was pure speculation and guesswork, finding no accurate foundation in the specifications or disclosures of the claim of the patent, but made with the desperate hope of saving an extremely broad claim.

The Court concludes that Claim 4 of the Reissue Patent No. 24,017 is invalid for several reasons. The all-encompassing breadth of the claim with a lack of specificity of proportions, coupled with the informative state of the prior art, both patented and published, as well as the prior public uses of which patentee was cognizant, impel a holding that patentee's stride forward in the art was not sufficient to merit a patent monopoly. Were it only for the breadth of the claim's scope, the Court might be hesitant, in view of *Binks Mfg. Co. v. Ransburg Electro-Coating Corp.*, 281 F. 2d 252 (1960) (Cer. Gr. 364 U.S. 926, Dismissed per curiam, 366 U.S. 211), to hold Claim 4 invalid. This Circuit's Court of Appeals (Judge Castle writing the opinion) there said at p. 257:

> "There is no requirement that quantitative values for such factors as voltage, spacing and liquid

> characteristics be recited. The fact that experimentation or the exercise of judgment is necessary to adapt a patented process to particular material or to obtain the particular results desired does not impair validity of the patent. *Lever Bros. Co. v. Procter & Gamble Mfg. Co.*, 4 Cir., 139 F. 2d 633-639."

But when that broad scope of the patent claim is considered in conjunction with the prior use at Briggs Body Company's plant, which prior use was participated in by patentee and so part of his awareness; and in conjunction with the disclosures of the Singer and Orozco patents (with the latter of whom Henricks was in one patent a co-patentee), the British patents, and the German publications, it appears to the Court that patentee is seeking unjustifiably to grasp for his own patented monopoly [391] that which was apparent or knowledgeable under the existing state of the art. The claim does not specify the kind of phosphate coating, the kind of meltable organic binding, and the kind of solid inorganic compound to be utilized, as well as not specifying the amounts and relative proportions of any such items. As defendants' proof showed, some processes could be conceived of ingredients of those classes which would not be workable. Several prior patents, some very old, and some cited publications, disclose borax as a lubricant. The fillers, such as borax, were said to be unctuous in their nature or slippery to touch. The prior patents also teach that phosphate coatings on metal are an aid in drawing, and, additionally, teach the lubrication of the coatings. Prior patents teach the use of soap for drawing metals. British and United States' patents teach the use of a dry film, the former with an organic binder with inorganic pigment. A prior publication taught that the addition of a filler such as borax could add to the film strength of a drawing lubricant, including soap. A British patent discloses that wear on tools is reduced by adding a pulverulent substance such as talc or litharge to the fat or oil lubricant. Talc is a pigment which is the softest material on Mohs' scale, having a rating of one. Litharge is mentioned in the patent in suit as one of the meltable or fusible pigments. Borax was known prior to the time of the patent, as a buffer, and its specific pH values are indicated in chemical reference and handbooks. A British patent disclosed that it had been customary to use oils or fats and to mix them with certain substances such as talc or litharge for the purpose of increasing their efficiency; tallow is in the classification of such fats and [392] it is one of the oldest so known, and it was noted it solidifies at room temperature.

There can be no question that there can be patentable invention in the combination of known elements which effect an unexpected and useful result. Thus it was recently said in *Minneapolis-Honeywell Regulator Company v. Midwestern Instruments, Inc.*, decided November 29, 1961, by the Seventh Circuit Court of Appeals (Judge Duffy):

> "This Court has often applied the well-established rule of law that a novel combination of elements, whether all new, or all old, or partly new and partly old, which so cooperate as to produce a new and useful result or a substantial increase in efficiency, is patentable."

The result of the aggregation in the instant cause, however, does not to this Court give rise to the degree of novelty or unforeseeable result that was to be found in that case, although the feature of utility might possible be present. Both phosphate coating and the use of borax or its equivalent, and the use of soap were individually known in the drawing of metals. Their combined use is indicated to give even greater efficiency and ease in performing the same drawing operations they were theretofore used separately to perform (and in the prior public uses, used conjointly to perform).

The Court therefore holds Claim 4 of the Reissue Patent No. 24,017 invalid.

/s/ Edwin A. Robson,
Judge.

February 1, 1962.

[396] IN THE DISTRICT COURT OF THE UNITED STATES.

* * (Captions — 56-C-1912 — 57-C-892) * *

FINDINGS OF FACT AND CONCLUSIONS OF LAW

[397] 1. (a) The above entitled suits were brought by plaintiffs for alleged infringement of United States patent Re. 24,017, dated June 7, 1955, for Method of Coating and Drawing Metal and Composition Therefor.

(b) By order of the Court dated November 19, 1959, the above entitled suits have been consolidated for trial upon the issue of the validity of claim 4 of the patent in suit, which is the only claim of the patent alleged in either suit to be infringed.

(c) The reissue patent in suit was issued to the alleged inventor, John A. Henricks, on an application filed and prosecuted by William Freeman, a patent attorney of Akron, Ohio. The patent was later assigned to the present plaintiff, Devex Corporation, of which the inventor Henricks is president, and then assigned by Devex Corporation to the plaintiffs, McCoy and TeGrotenhuis, the patent attorneys for Henricks and Devex Corporation, by conditional assignment subject to certain reversionary rights in Devex Corporation, for the purpose of enforcing the patent. This assignment was made after Henricks had tried personally to license the patent in the industry to no avail (R. 514).

[398] 2. (a) The patent in suit Re. 24,017 including claim 4 in issue is the outcome of an application, Serial 665,905, filed April 29, 1946, by the applicant and patentee, Henricks, for Metal Treatment and Composition for Same, which was abandoned in favor of a continuation-in-part application filed October 31, 1950, upon which later issued United States patent 2,588,234 dated March 4, 1952, and for which application for reissue was filed March 1, 1954, resulting in patent Re. 24,017 dated June 7, 1955, now in suit.

(b) The patent in suit is directed to lubrication of metal surfaces in cold drawing and deforming metal such as steel to desired form and shape by means of dies, representing the size, form and shape to be produced in the metal being worked. The use of lubricant between the contacting surfaces of the die and the metal being worked is necessary to reduce friction and prevent intimate contact between the die and the surface of the metal being worked to avoid scoring and tearing of the metal or galling of the dies, and prevent development by friction of sufficient heat at the place of contact or engagement to cause welding and seizure to occur between the die and the work.

(c) This is an old and well-known art, and methods and materials for lubricating the dies and the work have long been known and used.

[399] 3. The particular alleged improvement in issue in these cases which the patent defines in claim 4 in issue, is as follows:

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound melt-

> able at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

[400] 4. The particular practice at issue in this suit which claim 4 is contended to represent and cover is the practice of providing a zinc phosphate coating on the surface of the steel to be deformed; applying to that phosphate coating an aqueous solution or emulsion of sodium tallow soap and borax; drying or allowing to dry on the phosphate coating the sodium tallow soap containing borax until it forms a fixed film, and thereafter drawing or deforming the steel.

It is alleged with respect to this practice that the sodium tallow soap provides the solid meltable organic material of the claim for binding in place the borax, which is alleged to be the solid inorganic compound of the claim meltable at a temperature below the melting point of the ferrous metal phosphate of the phosphate coating and having a hardness not exceeding 5 on Mohs' hardness scale.

Mohs' hardness scale is a known standard for indicating the relative hardness of materials. It is used in the claim as a specification that the "solid inorganic compound" of the claim shall not be hard enough to scratch the steel being drawn.

[401] 5. Processes and methods of drawing and deforming metal and lubricating compounds for use therein, shown by the prior art in evidence to have been known prior to the patent in suit, are as follows:

(a) Salts such as sodium borate or sodium meta phosphate applied to the drawing dies where the wire to be drawn enters the die so that during the drawing operation on the wire heated to fairly high temperature, the sodium borate or sodium meta phosphate melts to a viscous state and lubricates the die aperture and the wire, or by leading the tungsten wire to be drawn through a bath of said substances, or by dusting the wire with said substances in the form of a powder so that in the subsequent heating of the wire the adhering substances are softened and are conducted together with the wire toward the die (Defendant's Exhibit 35, British Patent 11,439 of 1912 for Process of Hot Drawing Tungsten Wire).

The sodium borate and sodium meta phosphate are inorganic compounds meltable at a temperature below the melting point of ferrous metal phosphate and having a hardness not exceeding 5 on Mohs' hardness scale, as specified in claim 4 of the patent in suit.

(b) Water soluble soap compounds made by saponifying vegetable oils such as coconut oil, olive oil and palm oil, applied to the surface of the steel (sheet metal) at a temperature of 150° F. and allowed to dry out to form [402] a coating which will adhere to the metal during shaping or forming. The same or similar compound is used to lubricate the dies when the metal is being pressed to the desired shape (Defendant's Exhibit 36, Hopkins United States patent 1,769,577 of July 1, 1930). This soap is within the category of solid meltable organic material described in claim 4.

(c) In the process of cold drawing metal as in the manufacture of wires and tubing, a lubricant coating for the metal consisting of aluminum powder and nitro-cellulose suspended in a volatile liquid such as amyl acetate is applied to the surface of the metal to be drawn and dried thereon by evaporating the volatile solvent amyl acetate so that a fixed film or coating of nitro-cellulose containing the aluminum powder distributed therethrough is provided on the metal to serve as a lubricant during the drawing operation (Defendant's Exhibit 37, British Patent 367,198 of 1932).

In this coating the nitro-cellulose constitutes the solid meltable organic binding material containing distributed therethrough the aluminum powder which is an element and provides an inorganic pigment meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale, within the specifications for melting temperature and hardness required by the patent in suit (Gibson R. 595-599).

(d) Tallow in its raw state, or combined in the form of soap with certain metals, such as calcium, sodium, potassium, lead, aluminum and zinc, with mineral oil and containing filler materials or pigments like chalk, soap- [403] stone, mica, rosin, graphite, fireclay, potters clay, borax, etc., were published as known drawing compounds (Defendant's Exhibit 38, Transactions of American Society for Steel Treating, Volume XXI, January 1933 — December 1933, p. 187, paragraph 1 — Tallow; p. 188, paragraph 4 — Fillers).

Tallow or tallow soap with the filler material borax is within the definition of claim 4 specifying a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale.

(e) Tallow or palm oil soap alone or combined with aluminum stearate were published as known drawing compounds for drawing wire, are meltable at a temperature below the melting point of ferrous metal and have a hardness not exceeding 5 on Mohs' hardness scale, within the definition of the corresponding language employed in claim 4 of the patent in suit (Gibson R. 665-669) (Defendant's Exhibit 54, publication Wire & Wire Products, issue of October 1931, pp. 393 and 394).

The tallow and palm oil soaps disclosed are within the definition of solid organic binding material in claim 4 of the patent in suit, and the aluminum stearate when combined therewith would constitute a fusible pigment (patent in suit, column 9, Table 1 — Fusible Pigments) distributed therethrough.

[404] (f) In deforming steel by cold rolling, it was known to provide a lubricant between the rolling die and the steel being rolled and deformed to the desired shape, to prevent overheating of the dies, sticking of the metal and the dies, and scarfing or roughening of the surfaces of the metal. The material was made by preparing a dry mixture comprising 90% borax, 5% tri-sodium phosphate and 5% tallow soap dissolved in water in the proportion of 8 ounces of the dry mixture to each gallon of the solution, and applied either on the rolls or the metal stock or both, before or during the forming operation, so that during the forming operation the surfaces are sufficiently coated. This material was used in place of oils and greases and aqueous emulsions of oils and greases which are expensive and difficult to remove from the work after forming (Defendant's Exhibit 32, Orozco United States patent 1,982,065 dated November 27, 1934).

This material comprising borax and soap is substantially identical with the soap and borax materials disclosed in the patent in suit for use as a fixed film lubricant over phosphate coatings.

(g) Drawing lubricants made up to fat, such as tallow or palm oil, 75-85% saponified to provide soap, combined in the proportion of 20-35 parts by weight with mineral oil 30-50 parts by weight, and water 10-40 parts by weight, mixed to make up a paste having a consistency ranging from mayonnaise to heavy greases with which filler materials may be mixed to prevent metal-to-metal contact under [405] high pressures encountered in forging, stamping, drawing and the like, are disclosed in Defendant's Exhibit 45, Zimmer United States patent 2,258,309 dated October 7, 1941, column 1, lines 44-55, column 2, lines 1-17.

It is recommended (column 1, lines 8-44) that in place of filler materials of the type of talc, chalk, calcium carbonate and the like, filler materials such as salts of the phosphates, sulfides and borates of calcium, zinc, lead or tin be used to endow the lubricating compound with the ability to withstand higher pressures without metal failure, seizure or scoring and to reduce friction, facilitate the flow of metal into the die recesses and reduce the power requirements for the fabricating operations; and also to give the work an attractive burnished appearance which is not obtained by the well-known inert fillers, and reduce the frequency of splits, cracks or other blemishes in the drawings, forgings or stampings.

The saponified tallow disclosed in this patent is an organic binding material (namely, soap) corresponding to the organic binding material referred to in claim 4 of the patent in suit, and the fillers disclosed to be mixed in and used with it (namely, the zinc phosphate and the borates of calcium, zinc and lead) are solid inorganic compounds meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale, referred to in claim 4 of the patent in suit, and listed as such in the patent in suit in Table I — Fusible Pigments, column 9.

[406] 6. (a) It was well known in the art prior to the patent in suit on April 29, 1946, that it was a definite improvement and aid in cold drawing and deforming steel to provide the surface of the steel with integral phosphate coatings and apply lubricants over such coatings.

(b) The use of zinc phosphate coatings to which oil is applied as a lubricant in drawing and deforming steel tubes is disclosed in Defendant's Exhibit 42, British patent 496,866 of 1938.

(c) The drawing and deforming of steel provided with manganese phosphate coatings impregnated with oil or fat or a mixture of oil and fat as a lubricant is disclosed in Defendant's Exhibit 41, British patent 494,830 of 1938.

With respect to lubricants that had been known for use in drawing operations, this patent also discloses (column 1, lines 14-22):

> "It is known to treat iron pipes, in particular, prior to a drawing process, with fats or oils, or to precipitate deposits thereon, in order to soften the surface and to reduce the wear on the drawing tools. It has also been the practice to mix the oil or fat with pulverulent substances, such as talc or litharge, for the purpose of increasing its efficiency."

The fats disclosed in this patent include fats such as tallows, of which many are known to be solid at room temperature, and the litharge (lead oxide), which the patent states it had been the practice to mix with the oil or fat for the purpose of increasing its efficiency. There is thus disclosed a composition providing a solid meltable organic binding material (namely, fats known to be solid at [407] room temperature) containing distributed therethrough a solid inorganic compound (namely, the litharge) meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale, all within the definition of the corresponding language employed in claim 4 of the patent in suit. Lead oxide (litharge) is specifically listed in the patent in suit, column 9, Table I, under fusible pigments suitable for use as a solid inorganic compound meltable at a temperature below the melting point of ferrous metal phosphate and having a hardness not exceeding 5 on Mohs' hardness scale, called for by the corresponding language in claim 4 of the patent in suit (Gibson R. 617-623).

The British patent 494,830 therefore contains disclosure of a lubricating composition for drawing and deforming ferrous metal within the broad terminology employed in claim 4 of the patent in suit.

(d) Defendant's Exhibit 39, United States patent 2,105,015 to Singer, dated January 11, 1938, particularly discloses and recommends the use of phosphate coatings on the steel to be drawn lubricated with known methods of lubrication as a definite improvement and aid in drawing and deforming ferrous metal such as steel. It states, column 2, lines 53-55; page 2, column 1, lines 1-14:

> "Satisfactory processes for applying such coatings are well known in the art, such for example as the so- (page 2, column 1, lines 1-14) called Parkerizing process. They comprise treatment of the article with a heated dilute aqueous solution of phosphoric or oxalic acid which may or may not contain phosphates [408] or oxalates of iron, manganese, zinc or other metals in solution. Thereby there is formed on the article a dense thin crystalline coherent and tightly adherent coating of salts of phosphoric or oxalic acid which combines both chemically and physically with the metal of the base. Such a coating adapts the article admirably to mechanically working and reduces or eliminates the troubles arising from the contact of the article with the working element."

It also states, page 1, column 2, lines 22-33:

> "Although the coating thus formed may properly be considered a lubricant, as contrasted with a coating applied for some other purpose, as for example, increasing the rust or corrosion resisting properties of the metal, it should be fully understood that it is not a lubricant in the customary or ordinary sense, for the reason that the well known, present day

> methods of lubrication may also be used in conjunction with the practice of the present process, and in many instances will be an essential factor in obtaining proper results."

The patent also states, page 2, column 1, line 51, and column 2, lines 1 et seq.:

> "The use of coatings of the kind herein described (column 2, lines 1 et seq.) permits what might be termed deep, severe or even almost excessive reduction rates, as well as a series of normal reductions without the customary intermediate annealing operations.
>
> "In the practice of the invention at least those surfaces of the article which are to be in contact with the working element are provided with a coating of the type described, and the article is then worked in the customary manner, no change in procedure or tools being necessary. Such coatings are considerably cheaper than the coatings of soft metals heretofore applied, and if not already removed during the working operation they can be removed completely much more readily than the metallic coatings, as for [409] example, by simple pickling operations. In many instances no further removal of the coating is necessary after working, either because it has been substantially removed during the working operation or that portion which remains does not interfere with the use to which the article is subsequently applied."

(e) The efficacy of lubricated phosphate coatings as a definite improvement and aid in drawing and deforming steel is further evidenced and made known in the prior art.

Defendant's Exhibit 51, the publication Korrosion Und Metallschutz of June 1941, and translation, discloses the use of zinc phosphate coatings (pp. 3-4) lubricated with boring oil emulsions (p. 4) as lengthening the life of the drawing tools, reducing friction in the forming process, increasing the reduction and drawing speeds, and reducing the number of drawing operations (p. 7).

Defendant's Exhibit 52, the publication Metallwirtschaft of 1942, and translation, discloses (p. 11) improvements in drawing and deforming operations on iron and steel coated with zinc phosphate coatings which are lubricated by having formed thereon water insoluble soap films.

This is also disclosed in Defendant's Exhibit 53, the publication Stahl Und Eisen of 1942, and translation (p. 7).

[410] 7. Lubricated zinc phosphate coatings on steel were known and used as a successful aid in drawing and deforming steel cartridge cases in this country in 1942 and 1943. An operation of this kind was carried on by the Buick Motor Division of General Motors Corporation in 1942 and 1943 and was described and published in Defendant's Exhibit 48, American Machinist issue of May 13, 1943 (Shultz R. 644-650).

A similar operation was carried on in drawing and deforming steel to make steel cartridge cases by Briggs Manufacturing Company at Detroit, Michigan, in 1943, where zinc phosphate coating was applied to the steel to be drawn and a grease was applied as a lubricant over the zinc phosphate coating (Tousley Deposition, pp. 31-32; Henricks Deposition, pp. 22-23).

Northern Engraving & Manufacturing Company of La Crosse, Wisconsin, in 1943 manufactured 20-mm. steel cartridge cases or shells by drawing and deforming zinc phosphate coated steel over which was applied a lubricant made up of sodium stearate, stearic acid and water with sulfur distributed therethrough (Depositions of Wayne G. Dickinson and Lew F. Scott). As received, the lubricant material was semiliquid, not liquid enough to pour. It was applied hot. It did not become a hard solid after drying, but formed a waxy type of film on the phosphate coating which was plastic and easily movable with the finger (Depositions of Wayne G. Dickinson and Lew f. Scott, pp. 19-20, 24-25, 27, 37, 54, 59-60).

[411] 8. In 1942 and 1943 the Gilron Products Company of Cleveland, Ohio, with whom the patentee of the patent in suit, Henricks, was associated, first as consultant in 1942 and then as an employee from 1943 to 1945, manufactured and marketed lubricant compositions under the trade name Drawcote, for use in drawing and deforming steel, and which were extensively sold and used in 1942 and 1943 and subsequently, in drawing and deforming steel.

These lubricant compositions consisted principally of sodium soaps formed from tallow and palm oil, and of borax. The soap comprised from 10-33% by weight and the borax comprised from 67-90% by weight, of the compositions.

This material was produced in the form of a dry powder based upon and derived from the knowledge and previous experience of Gilbert H. Orozco, who with one Roland Whitbeck comprised the partnership under the name of Gilron Products Company, which was later incorporated under the same name as an Ohio corporation.

Gilbert H. Orozco is the patentee of United States patent 1,982,065 dated November 27, 1934, Defendant's Exhibit 32, which discloses the use of a dry mixture comprising borax 90%, trisodium phosphate 5% and tallow soap 5%, applied in aqueous solution in the operation of deforming steel by cold rolling to provide a lubricant coating between the rolling die and the surface of the metal being rolled and deformed to prevent overheating of the dies and consequent sticking of the material being rolled and the [412] dies, and to prevent scarfing or roughening of the surface of the metal being worked upon.

The compositions that were manufactured and sold by Gilron Products Company in 1942 and 1943 and subsequently under the trade name Drawcote were in the form of dry powder composed principally of sodium soap and borax in the proportions by weight of 10-33% soap to 67-90% borax.

This dry powder was applied by the user in drawing metal by making a heated emulsion or solution of the soap-borax powder in water, applying it hot to the surface of the metal to be drawn, and either drying or allowing it to dry as a fixed film on the surface of the metal by evaporation of the water therefrom.

Drawcote was extensively sold and successfully used in 1942 and 1943 in the cold drawing and deforming of steel, and especially in the cold drawing and deforming of steel in the manufacture of steel cartridge cases (Henricks R. 338-363).

[413] 9. Prior to filing the first application for the patent in suit on April 29, 1946, and while still employed by Gilron Products Company, the patentee of the patent here in suit, Henricks, jointly with Gilbert H. Orozco of Gilron Products Company, filed application for United States patent on August 2, 1943, Serial 497,117, which resulted in the grant of United States patent 2,469,473 on May 10, 1949 (Defendant's Exhibit 1) and in the grant upon a division of the same application of United States patent 2,530,837 dated November 21, 1950 (Defendant's Exhibit 2). These applications and patents were assigned to Gilron Products Company.

These applications and the patents disclose and claim as invention both the use of soap-borax lubricants in drawing steel, and soap-borax lubricant as a composition, which were being sold by Gilron Products Company in 1943 under the trade name Drawcote and used extensively by the public in the year 1943 and subsequently in drawing and deforming ferrous metal. As the subject matter of invention it was claimed in these patents that the soap-borax lubricants provide what is termed stepwise lubrication in the process of drawing and deforming ferrous metal. That is to say, the soap-borax composition applied as a dry film to the surface of the ferrous metal to be drawn and deformed provided lubricating materials having different melting points so that in the process of drawing, the soap of the composition, having the lower melting point, would, by melting first under the pressure and heat generated in the drawing operation, provide initial lubrication between the metal being drawn and the drawing die, and when [414] temperatures were reached in the drawing operation at which soap would cease to provide lubrication, the borax, having the higher melting point, would remain as a barrier preventing contact between the die and the metal being worked and would eventually melt and provide a fluid or plastic glasslike film of borax to continue to provide a barrier between the die and the metal being worked and a lubricant during the higher and ultimate temperatures reached in the drawing operation.

The purpose, object and operation are identically described in both patents, in patent 2,469,473 in column 3, lines 59-74, and in patent 2,530,837 in column 3, lines 40-55, as follows:

> "A specific object of the invention is to provide an improved method of treating metals preparatory to the cold drawing or forming thereof in order to insure both stepwise cooling and stepwise lubrication of the metal. That object is accomplished, for example, by coating the surface of the metal to be worked with a composition, the ingredients of

> which will act progressively and successively both as coolants and as lubricants when the coating is subjected to the extreme pressures incident to drawing or forming operations and temperatures approaching the melting point of the worked metal or, in the case of a non-metallic tool or die, the point at which such working element might be damaged by working that particular metal."

It is further stated in these patents, in patent 2,469,473 in column 9, lines 12-32, and in patent 2,530,837 in column 8, lines 71-75, and column 9, lines 1-16:

> "Further to explain the operation of the process it will be seen that by the incorporation of sodium tetraborate (borax) with high titre soap we have a naturally [415] slippery composition, the borax of which melts at 75° C., gives up its water of crystallization at 200° C. and intumesces at that temperature to form an impalpable powder. The powder so formed after intumescence could be considered analogous to a solid filler in known types of lubricant; but said powder has, in addition, an important physical property. At 741° C. the intumesced borax becomes fluid and thereby serves to lubricate the metal being worked. Similarly the higher secondary melting point glass forming substances, following dehydration and intumescence, become fluid lubricants at respective increased temperatures and those added ingredients and the proportions thereof are selected so as to fill in any gaps that may occur, that is to bridge over from one temperature range to another."

These patents also state, in patent 2,469,473, column 6, lines 72-75, and column 7, lines 1-3, and in patent 2,530,837, in colunn 6, lines 54-60, as follows:

> "We have noted particularly that when boric acid or borax are used in the composition the hydrated colloids remain on the worked metal as an amber colored soluble substance which remains slippery to the touch and has no appearance of having been carbonized or polymerized and is readily removed in H_2O."

These patents also attribute greatly increased die life to the soap-borax lubricants where they state, in patent 2,469,473, column 8, lines 71-75, column 9, lines 1-6, and in patent 2,530,837, in column 8, lines 55-65:

> "As an instance of the efficiency of the present process, finishing dies for drawing stainless steel wire containing chromium, nickel and titanium and formerly producing a maximum of twenty-five pounds of wire, by the use of the present composition, were able to [416] produce from 180 to 250 pounds. We might mention that we produced with the present process a 30% increase in die life in the drawing of steel shell casings where a copper coating had previously been used in order to protect the dies."

[417] 10. Henricks, the patentee of the patent in suit Re. 24,017, in 1945 left the employ of the Gilron Products Company where he had participated in and was familiar (1) with the sale of the soap-borax lubricants described in the patents 2,469,473 and 2,530,837 and (2) with the public use of those lubricants in drawing and deforming steel in the year 1943 and subsequently, and (3) knew also in 1943 that lubricated phosphate coatings were in public use in drawing and deforming steel. On April 29, 1946, Henricks as sole inventor filed the first of his applications which resulted in the patent in suit Re. 24,017. This was two years and eight months after August 2, 1943, when he had joined as co-inventor with Gilbert Oroz-

co in filing the application which resulted in patent 2,469,473 and 2,530,837, which were assigned to Gilron Products Company.

The patent in suit proposes the use of the self-same stepwise lubrication (in column 8, lines 45-75, and column 9, lines 1-18) with the identical soap and borax lubricants which are disclosed in the prior patents 2,469,473 and 2,530,837. The patent in suit in column 15, lines 51-52, recommends the type of lubricant disclosed in patent 2,469,473, and at line 66 recommends the type of lubrication disclosed in the Whitbeck patent 2,470,062, both of which are admitted to have been widely sold and in public use in 1943 (Henricks R. 357-358, 362-363, 376-377, 381-382).

The alleged improvement of the patents in suit is to apply these Drawcote lubricants upon steel provided with known iron or zinc phosphate coatings (patent in suit, column 8, lines 55-75, column 9, lines 1-15, column 7, lines 40-45 and 55-75).

[418] 11. In answer to defendant's interrogatories 17-21 prior to trial respecting what plaintiffs' contention would be at the trial concerning chemical reaction or reactions (a) between the phosphate coating and the soap; (b) between the phosphate coating and the borax; (c) between the phosphate coating, the soap and the borax; (d) other than the reactions identified in answer to (a), (b) and (c), plaintiffs stated in their answer to interrogatory 21:

> "The X-Ray diffraction tests indicate that certain known compounds are formed. They also indicate by peaks that certain other unknown or unidentified compounds are formed. Plaintiffs will, therefore, contend that chemical reactions do occur but are unable to specifically describe them and will not contend, at the trial of this cause, that any specific chemical reactions occur."

[419] 12. Plaintiffs alleged at trial that compounds other than zinc phosphate and the borax are formed by chemical reaction of borax with soap and the zinc phosphate of the phosphate coating, and are essential to the successful operation of the process described in claim 4 of the patent in suit.

The patent in suit does not describe any chemical reactions in the drawing operations with soap-borax applied over phosphate coatings which produce or require the production of any other compounds to be essential to successful drawing operations; claim 4 of the patent in suit contains no reference to or requirement of the presence of such other compounds in the operation of the process defined by the claim.

The other compounds alleged to be produced by a chemical reaction of the borax in the coating and the phosphate of the coating were not identified with certainty by or in the X-ray diffraction patterns produced. Plaintiffs' Exhibits 22, 23, 24 and 25 (R. 191-210, 543-558).

It was admitted that no quantitative values or amounts of the compounds alleged to have been formed by chemical reaction of the borax and alleged to be present could be determined from the X-ray diffraction patterns (R. 243-245). There is no evidence that the compounds alleged to have been formed by chemical reaction of the borax and to have been present in the samples tested were present in any significant quantity or had any controlling or significant effect in the drawing operations.

[420] 13. Henricks in his testimony at the trial (R. 416-421) attempts to predicate the invention of the patent in suit upon the borax in the soap-borax lubricant as mineralizing the phosphate of the coating, likening it to mineralization and metamorphosis in mineralogy by which coarse stone like limestone under the heat and pressure becomes marble or a carbonaceous deposit becomes graphite or a pyroxene rock

becomes mica; that the conception of the patent was to make this metamorphosis get rid of the highly abrasive phosphate; that the metamorphosis and the mineralizing approach is what he centered upon, to put in the lubricant film a flux agent, so that it is no longer a hard, abrasive, sandpaper bed, but one that will melt and flow into a glass, that that is invention he swore the oath to.

He admits that nothing of this alleged theory and teaching is contained in the patent in suit Re. 24,017 (R. 447, 503-504).

It appears that there was no subject matter relating to alleged metamorphism, fluxing and mineralizing in Henrick's original application Serial 665,905, filed April 29, 1946 (Plaintiffs' Exhibit 2); that such subject matter first appeared in Henrick's second application Serial 193,290, filed October 31, 1950 (Plaintiffs' Exhibit 3), at pages 27-31 of that application; and that all of this subject matter and the claims relating thereto was cancelled out of the application by supplemental amendment made October 25, 1951 (Plaintiffs' Exhibit 3, page 100) where page 27 of the application from line 10 through and including [421] line 23 of page 31 of the application was cancelled.

At page 104 the claims of the application relating to the alleged metamorphism, fluxing and mineralizing were cancelled, and at pages 104-105 of Plaintiffs' Exhibit 3, applicant's attorney stated (page 104):

> "At the interview of September 17, applicant's attorney understood that the Examiner's position was as follows: * * *"

and at page 105:

> "5. Claims 13-20 relating to applicant's mineralizer flux concept for lower melting eutectic mixtures was a separate invention and should be divided out of this application."

and at page 108:

> "Applicant has also cancelled without prejudice subject to a continuation-in-part application references in the specification to his metamorphism and mineralizer invention."

Nothing appears in the application for the reissue patent in suit Re. 24,017 (Defendant's Exhibit 65) relating to or concerning this alleged metamorphism, fluxing and mineralizing, and nothing appears in the patent in suit Re. 24,017 regarding it.

It thus appears that if the applicant Henricks made any invention predicated or based upon alleged metamorphism, fluxing and mineralizing, it has been removed and forms no part of the alleged invention disclosed in the patent in suit or claimed in claim 4 in issue here.

[422] 14. In the early part of 1943 the Briggs Manufacturing Company in Detroit, Michigan, was manufacturing 75-mm. steel shell cases by drawing and deforming operations using zinc phosphate coated steel with grease applied as a lubricant over the zinc phosphate coatings.

About June 1943, Whitbeck of Gilron Products Company sold the Gilron Products soap-borax Drawcote lubricant to the Briggs Manufacturing Company for use in drawing and deforming the steel shell cases.

Briggs Manufacturing Company used the soap-borax Drawcote lubricants during the summer and fall of 1943 in the production of steel shell cases.

In the shell case drawing operations at Briggs Manufacturing Company there were six drawing and deforming operations performed on each shell case to produce the final form. Prior to each of four of these drawing operations a zinc phosphate coating was applied to the shell case, and the shell cases were then lubricated at the drawing press by applying grease to the phosphate coatings.

In using the Gilron Products soap-borax Drawcote lubricants the Briggs Manufacturing Company began by applying the Drawcote lubricant upon the phosphate coatings, in place of the grease previously used, prior to each of the four drawing operations and found it to operate successfully.

During the course of the summer of 1943 the four operations of phosphate coating the steel shell cases before [423] applying the Drawcote lubricant were eliminated by gradually reducing the number of phosphate coating operations employed, until finally all four phosphate coating operations on the steel shell cases had been eliminated and the Drawcote lubricant was thereafter applied to the bare steel shell cases.

During this interval of gradually eliminating the phosphate coatings and while the Drawcote lubricant was being used over phosphate coatings, shell cases were being produced at the rate of 5 or 6 thousand cases per day.

The phosphate coating operations were eliminated for the purpose of speeding up the production of the shell cases and reducing cost of the drawing operations, and not because the steel shell cases were not being successfully drawn with the phosphate coatings and with the soap-borax Drawcote lubricants applied to the phosphate coatings (Francis M. Tousley deposition; Harold F. Brown deposition).

[424] 15. Claim 4 of the patent in suit describes and claims no more than was known and successfully demonstrated and used by the Briggs Manufacturing Company in 1943 in using the Drawcote soap and borax lubricants, namely, the process of working ferrous metal (the steel being made into shell cases by drawing and deforming at Briggs Manufacturing Company in 1943) which comprises forming on the surface of the metal a phosphate coating (the zinc phosphate coating ap-

plied on the surface of the steel being made into shell cases by Briggs Manufacturing Company in 1943) and superimposing thereon a solid meltable organic binding material (the Gilron Products Drawcote lubricant which contained sodium tallow soap) containing distributed therethrough a solid inorganic compound (the borax contained in the Drawcote lubricant applied to the zinc phosphate coated steel shell cases at Briggs Manufacturing Company in 1943) meltable at a temperature below the melting point of the ferrous metal phosphate (and also below the melting point of the zinc phosphate, which is below the melting point of ferrous phosphate, patent in suit, column 9, Table I) of said coating and having a hardness not exceeding 5 on Mohs' hardness scale, and thereafter deforming the metal.

[425] 16. The date of invention relied upon by Henricks and plaintiffs for claim 4 of the patent in suit in issue is April 29, 1946, the date of the filing of the first application Serial 665,905 by the applicant and patentee Henricks, plaintiffs' answer to defendant General Motors' interrogatory 13, as follows:

(Defendant's Interrogatory 13):

> "State the date upon which plaintiffs will rely at the trial of this cause for the making of the alleged invention described in claim 4 of the United States Letters Patent Reissue No. 24,017, dated June 7, 1955, by the applicant for said patent, John A. Henricks."

(Plaintiffs' Answer to Interrogatory 13):

> "Assuming that no additional prior art or prior uses will be cited against Reissue Patent 24,017, plaintiffs will rely upon April 29, 1946 as the date upon which the invention of Patent 24,017 was made."

[426] 17. The plaintiffs and Henricks admit that at Briggs Manufacturing Company in Detroit, Michigan, in 1943, in the manufacture of 75-mm. steel cartridge cases by drawing and deforming steel, the Gilron Products soap and borax lubricant Drawcote was used over phosphate coated steel, and do not deny that such use occurred before the invention of claim 4 of the patent in suit Reissue 24,017 by the applicant Henricks (Defendant's Interrogatory 8; Plaintiffs' Answer to Interrogatory 8; Defendant's Interrogatory 11; Plaintiffs' Answer to Interrogatory 11):

(Defendant's Interrogatory 8):

> "Do plaintiffs deny that in the year 1943 Briggs Manufacturing Company at Detroit, Michigan, manufactured steel cartridge cases for the United States Government by drawing and deforming the steel material into the form of 75-mm. cartridge cases; that in the said manufacturing operations the surface of the steel material, prior to being drawn and deformed, was provided with a phosphate coating, and that there was superimposed on said phosphate coating a lubricant composition comprising by weight: soap 15%, borax 40%, boric acid 20%, potassium carbonate 25%, which formed a fixed film on said phosphate coating comprising a solid meltable organic binding material (namely, soap) containing distributed therethrough a solid inorganic compound (namely, borax) meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on Mohs' hardness scale, and that the said coated steel material was drawn and deformed to produce 75-mm shell cases?"

(Plaintiffs' Answer to Interrogatory 8):

> "Plaintiffs admit that, at Briggs Manufacturing Company at Detroit, Michigan, in 1943 in the manu- [427] facture of 75 mm. cartridge cases, there was a casual fortuitous use of a soap and borax lubricant over a phosphate coating in connection with the manufacture of a small number of cartridge cases. No one at Briggs Manufacturing Company or anywhere else learned anything from this activity. Plaintiffs deny anything beyond this point and specifically deny that this activity constituted a prior public use within the meaning of 35 U.S.C. 102 (b)."

(Defendant's Interrogatory 11):

> "Do plaintiffs deny that the operations at Briggs Manufacturing Company in the year 1943, stated in interrogatory 8 above, occurred before the alleged invention described in claim 4 of the United States Letters Patent Reissue No. 24,017, dated June 7, 1955, by the applicant for said patent, John A. Henricks?"

(Plaintiffs' Answer to Interrogatory 11):

> "No."

[428] 18. The evidence shows that Whitbeck of Gilron Products Company and the applicant for the patent in suit in demonstrating the utility of the Gilron Products soap-borax Drawcote lubricants and in promoting use over bare steel without undercoatings, followed a procedure of first demonstrating that such lubricants would operate successfully when applied to the undercoatings, such as copper undercoatings and phosphate undercoatings (Henricks deposition prior to trial, pp. 18, 19, 21, 22, 23; testimony at trial, R. 387-390).

[429] 19. The evidence further shows that in 1943 and during the time of the employment there of Henricks, the applicant for the patent in suit, Gilron Products Company regarded it to be to its financial interest and benefit in promoting the sale and use of the soap-borax Drawcote lubricants to also promote and advocate the elimination of the use therewith of phosphate undercoatings, which were then known to be in use with other lubricants applied thereto in drawing and deforming steel (Henricks deposition prior to trial, pp. 45 and 48).

[430] 20. The evidence of record establishes that the Drawcote soap-borax lubricants were used successfully in drawing the zinc phosphate coated steel shell cases at Briggs Manufacturing Company in 1943. That the use was known to the Briggs Manufacturing Company personnel and was public and was known to and participated in by Whitbeck of Gilron Products Company and by Henricks, the patentee of the patent in suit, who was then in the employ of Gilron Products Company. That the use was in and during the normal course of production of the steel shell cases and continued for a substantial period. That the Briggs Manufacturing Company established successful use of the Drawcote soap-borax lubricants when applied over the phosphate coatings in the normal course of production of steel shell cases before it established that the Drawcote soap-borax lubricants could be used in production successfully without the phosphate coatings.

[431] 21. The Northern Engraving & Manufacturing Company of La Crosse, Wisconsin, from about the end of 1942 until past the middle of 1943, manufactured 20-mm. steel cartridge cases or shells by drawing and deforming zinc phosphate coated steel over which was applied a wax-like lubricant made up of sodium stearate and stearic acid with sulfur distributed therethrough, as described in Finding 7. This production obtained a magnitude of approximately

50,000 cartridge cases per day (Depositions of Wayne G. Dickinson and Lew F. Scott).

Sulfur is one of the fusible pigments listed in the patent in suit Re. 24,017, column 9, Table I — Fusible Pigments. The patentee, Henricks, considers sulfur to be an inorganic pigment within the terminology of claim 4 of the patent in suit (Henricks, R. 513-514).

[432] 22. Of the prior art patents and publications referred to heretofore in Findings 5 and 6, the Patent Office had called to its attention and considered during the course of the prosecution in the Patent Office of the various applications which resulted in the patent in suit and in the allowance of claim 4 thereof in issue, the following:

The prior British patent 367,198 of 1932, Defendant's Exhibit 37, which discloses the use in drawing and deforming steel of a fixed lubricant film of nitro-cellulose with powdered aluminum distributed therethrough;

The United States patent to Zimmer 2,258,309 of October 7, 1941, the Defendant's Exhibit 45, which discloses lubricants for drawing and deforming steel composed of a paste comprising soap, mineral oil and water, and that fillers, such as zinc and calcium phosphate and the borates of calcium, zinc and lead, may be used therein;

The British patent 496,866 of 1938, Defendant's Exhibit 42, which discloses the use in drawing and deforming steel of a zinc phosphate coating applied to the surface of the steel and lubricated with oil;

The Orozco and Henricks United States patent 2,469,473, application filed August 2, 1943, patent granted May 10, 1949, Defendant's Exhibit 1, which discloses the use of soap-borax lubricants referred to and recommended for use by the patent in suit Re. 24,017, applied as fixed film on the surface of steel, in drawing and deforming steel.

[433] The Patent Office is not shown to have had called to its attention or to have considered:

The Transactions of the American Society of Steel Treating, Volume XXI, January 1933-December 1933, Defendant's Exhibit 38, disclosing that lubricants composed of tallow soap having mixed therewith filler materials, among which borax is named, were known as lubricants for use in drawing and deforming steel;

The publication Wire & Wire Products issue of October 1931, Defendant's Exhibit 54, disclosing that it was known to use tallow or palm oil soap combined with aluminum stearate as a drawing compound in drawing wire;

The British patent 494,830 of 1938, Defendant's Exhibit 41, disclosing that it was known in drawing and deforming steel to coat the steel with manganese phosphate coatings and to lubricate the phosphate coating with oil or fat, and disclosing that it was also known to mix the oil or fat with litharge (a lead oxide listed in the patent in suit Re. 24,017, column 9, Table I, as a fusible pigment suitable for use in the lubricant materials of the patent in suit) for the purpose of increasing its efficiency;

The United States patent 2,105,015 to Singer, Defendant's Exhibit 39, disclosing and recommending the use in drawing and deforming steel of phosphate coatings, including zinc phosphate, and recommending that the known methods of lubrication be used therewith;

[434] The publication Korrosion und Metallschutz of June 1941, Defendant's Exhibit 51, disclosing that it was known that the use of lubricated zinc phosphate coatings was a definite aid and improvement in drawing and deforming steel as lengthening the life of the drawing tools, reducing friction in the forming process, increasing the reduction and drawing speeds, and reducing the number of drawing operations;

The publication Metallwirtschaft of 1942, Defendant's Exhibit 52, disclosing improvements in drawing and deforming on iron and steel coated with zinc phosphate coatings lubricated by having water insoluble soap films formed thereon.

It is not shown to have been known to the Patent Office that the process of drawing and deforming steel coated with a zinc phosphate coating with the soap and borax Drawcote lubricants applied thereto was known and used successfully in 1943 by the Briggs Manufacturing Company.

It is not shown to have been known to the Patent Office that the process of drawing and deforming steel provided with a zinc phosphate coating and having applied thereto a waxlike film of sodium stearate and stearic acid with sulfur distributed therethrough was known and used successfully in 1942-43 by the Northern Engraving & Manufacturing Company of La Crosse, Wisconsin.

[435] 23. The function of a phosphate coating in drawing operations is to form on the metal surface a dense, thin, crystalline, coherent and tightly adhering coating of salts of phosphoric acid which will provide barrier material to separate the drawing die from the metal being worked and prevent scoring and galling engagement between the die and the metal being worked, and will provide a surface for retaining in place the lubricant applied to it (United States patent to Singer 2,105,015, Defendant's Exhibit 39; British patent 494,830, Defendant's Exhibit 41; British patent 496,866, Defendant's Exhibit 42).

[436] 24. The function of a dry film lubricant in drawing operations is the same whether the dry film lubricant is applied directly to the surface of the ferrous metal or is applied over a phosphate coating on the ferrous metal (Houdaille Request for Admission 10, filed November 7, 1960, which stands

unanswered and therefore is admitted by plaintiffs; and Henricks deposition, p. 50).

[437] 25. The use of lubricated phosphate coatings in drawing and deforming metal was clearly taught and disclosed in the British patent 496,866 of 1938, Defendant's Exhibit 42, and in the British patent 494,830 of 1938, Defendant's Exhibit 41.

The combination of a phosphate undercoating with the then "present day methods of lubrication" was taught and described by the Singer United States patent 2,105,015 of January 11, 1938 (Defendant's Exhibit 39).

The soap-borax Drawcote dry film type of lubricant was one of the methods of lubrication well known and in public use in 1943, more than two years prior to April 29, 1946, the date of filing of the application for the patent in suit (Henricks R. 338-363). Its combination with a phosphate undercoating for providing lubrication and further protection to the surfaces of the work and the dies was therefore obvious to a person having ordinary skill in the metal drawing art in view of the teachings and disclosures of the above prior art in 1943, more than two years prior to the time, April 29, 1946, that the plaintiffs rely upon for the making of the alleged invention of claim 4 of the patent in suit.

[438] 26. The patent in suit, in so far as the alleged uses of the soap-borax lubricants by defendants in the cases at bar are concerned, contains no disclosure or teaching other than (column 15, lines 50-52, lines 67-68, and column 9, lines 1-15) to apply to phosphate coatings the soap-borax lubricants disclosed in the Orozco and Henricks patent 2,469,473 (Defendant's Exhibit 1) and the soap-borax lubricants disclosed in the Whitbeck patent 2,470,062 (Defendant's Exhibit 3), admittedly in prior public use in 1943, more than two years prior to the filing of the first application for the patent

in suit. This use was admittedly demonstrated and successfully made at and by the Briggs Manufacturing Company in 1943. This use of the soap-borax lubricants was successful, and while now alleged by plaintiffs to have been experimental, there is no evidence that any further experiment was necessary or required to successfully perform and utilize the process defined in claim 4 in issue, which in so far as the process alleged to be employed by defendants in these cases is concerned, is simply to provide a phosphate coating on steel and to apply to it the soap-borax lubricants on sale and in public use in 1943 and known and available and demonstrated as effective drawing lubricants in 1943 both when applied to phosphate coated steel and to steel without the phosphate undercoating.

[439] 27. The evidence establishes that in 1943 and for more than two years prior to the time, April 29, 1946, the date relied upon by plaintiffs in this case for the making of the invention of claim 4 of the patent in suit, the differences between the subject matter sought to be patented in claim 4 and the prior art were such that the subject matter as a whole would have been and was obvious to persons having ordinary skill in the art of drawing and deforming steel.

[440] 28. Claim 4 of the patent in suit is indefinite and fails to particularly point out and distinctly claim, as required by the Patent Act, 35 U.S.C. Section 112, the subject matter which applicant regards as his invention.

With respect to the use of borax as the solid inorganic compound of the claim, in answer to defendant's interrogatory 16:

* * *

> "State the minimum and the maximum proportions of borax and soap that plaintiffs will contend

> at the trial of this cause to be within the scope, of the said claim 4 of said reissue patent."

plaintiffs answered as follows:

* * *

> "Plaintiffs will make no contentions and cannot speculate as to the minimum and maximum proportions of borax and soap which might be within the scope of claim 4 of Reissue Patent No. 24,017 because all circumstances must be evaluated and considered."

At the trial the patentee Henricks speculates (R. 468-504) with vague references to unidentified literature regarding mineralogy and cosmetics, without being able to define any minimum or maximum amount of borax required, and his final summation of the matter leaves the question wholly indeterminate and indefinite (R. 501, 503, 504).

Claim 4 says nothing whatever about the amounts or proportions of "solid meltable organic binding material," or the amounts or proportions of "solid inorganic compound."

As written, the claim includes as "solid meltable organic binding material" all of the multitude of compounds mentioned in the patent and others that could be selected [441] from the tables and literature which could be regarded as organic — capable of becoming solid — and meltable. It is alleged in this case to include also sodium stearate soap, which is listed in the standard chemical handbooks as an *inorganic* material (Dr. Gibson, R. 794-796, 803-808, 810-812).

As written, the claim includes as "solid inorganic compound" all compounds listed in column 9, Table I — Fusible Pigments, in the patent in suit, which could be selected from the tables and literature and which would melt below the melting point of ferrous phosphate and have a hardness less than 5 on the Mohs' hardness scale.

The claim contains no limits or instructions as to the proportions of such compounds that would be operable to carry out the alleged process invention stated by the claim.

The claim does not specify or call for the alleged mineralizing, metamorphizing or fluxing of the phosphate of the coating to form glass, or for the alleged emulsifying of the residual coating or film left after drawing.

There is no evidence that all of the materials includable within the terminology of the claim would perform the alleged functions.

No one could determine otherwise than by extensive experiments whether all or how many of the compound includable within the terminology employed could be used, or in what mixtures or proportions they could be used, nor whether they would accomplish the alleged mineralizing, metamorphizing or fluxing.

[442] The claim does not particularly point out and distinctly claim the alleged invention, i.e., emulsifying or mineralizing, metamorphizing and fluxing, that Henricks, (R. 421) states he swore the oath to. All such matter was cancelled from the application for the patent (Finding 13).

Henricks considers sulfur to be an inorganic pigment within the terminology of claim 4, and admits that it performs none of the alleged glass forming mineralizing functions of borax, and is of no help in cleaning effect (R. 513-514).

[443] 29. Henricks, the patentee of the patent in suit, testified that his invention in the use of borax as the solid inorganic compound specified in claim 4 is to prevent the formation of a water insoluble soap film on the phosphate coating. The evidence of record stands uncontroverted that in the lubricant Bonderlube 235 the inclusion in the sodium soap of a small amount of borax, approximately 3% of the soap, results in controlling the pH, i.e., the acidity and

alkalinity, of the aqueous soap solution with which the zinc phosphate coated article is treated and in forming water insoluble soap (zinc stearate) as an integral part of the phosphate coating (R. 705-711, 731, 739-741, 790-794, 800-802). This is a result and effect of the use of borax as the solid inorganic compound in the process broadly described in claim 4 of the patent in suit which is directly contrary to the patentee Henricks' own statement of his alleged invention. It is neither disclosed nor suggested in the patent in suit (R. 469, 483-491); Henricks Deposition, p. 49). This demonstrates the indefiniteness of claim 4, in which the amounts and proportions of the compounds (solid meltable organic binding material containing distributed therethrough a solid inorganic compound) are left wholly indefinite and indeterminable, and further demonstrates that the claim is broader than the invention the patentee made or conceived.

[444] Conclusions of Law.

1. Claim 4 of the patent in suit Re. 24,017 is invalid:

(a) On the ground of lack of lawfully patentable invention in view of the prior art known and practiced at and before the time the alleged invention of claim 4 was made;

(b) On the ground that the process of claim 4 was known to and used by others before the applicant for the patent in suit claims to have made the discovery or invention thereof;

(c) On the ground that the patentee did not invent the subject matter purported to be described in claim 4 but merely adopted a process which, in view of the prior art and practice known in 1943, was obvious and known to persons familiar with and skilled in the art of drawing metal;

(d) On the ground that claim 4 defines merely an aggregation of process steps that were separately old and well known and that when combined produce no new, unexpected or unobvious result.

(e) On the ground that claim 4 fails to meet the requirements of the Patent Act, 35 U.S.C. Section 112, in failing to particularly point out and distinctly claim subject matter which the patentee regards as his invention, or subject matter for which the patentee is lawfully entitled to Letters Patent.

2. That the complaints filed herein be dismissed for want of cause for action.

/s/ Edwin A. Robson,
United States District Judge.

Date June 29, 1962.

[448] IN THE UNITED STATES DISTRICT COURT.
(Captions — 56-C-1912 — 57-C-892)

* * *

FINAL JUDGMENT

The above-entitled actions having been consolidated for trial by order of this Court entered November 19, 1959 upon the common issue of the validity of Claim 4 of United States Letters Patent Reissue No. 24,017, dated June 7, 1955, and having come on for trial upon the merits of said common issue, and this Court having duly considered the evidence presented at the trial and the briefs filed by the parties by their respective attorneys and having rendered and filed its Decision On Merits On Validity Of Claim 4 of Reissue No. 24,017 on February 1, 1962, and this Court having considered the Findings of Fact 1 to 29 and [449] Conclusions of Law 1 and 2 inclusive, and Revised Findings of Fact 3 and 7 submitted by defendant, General Motors Corporation, and adopted by defendants, Metal Lubricants Co. and Houdaille Industries, Inc., and the defendant, Metal Lubricants Co., having submitted three additional Findings of Fact and an additional Conclusion of Law, and plaintiffs having submitted their objections to Findings of Fact 5d, 6c, 11, 14, 16, 18, 20, 21, 22, 24, 26, 28 and 29 submitted by defendants and to the additional Findings of Fact and Conclusion of Law submitted by Metal Lubricants Co.,

It Is Hereby Ordered, Adjudged and Decreed:

1. That plaintiffs' objections to Findings of Fact 5d, 6c, 11, 14, 16, 18, 20, 21, 22, 24, 26, 28 and 29 last submitted by defendant, General Motors Corporation, are disallowed and said Findings of Fact and Conclusions of Law, including revised Findings of Fact 3 and 7, last submitted by defendant, General Motors Corporation, and adopted by defendants Metal Lubricants Co., and Houdaille Industries, Inc., are adopted and entered herein as those of this Court.

2. That the objections of plaintiffs to the additional Finding of Fact 31 and Conclusion of Law 3 tendered by defendant, Metal Lubricants Co., are sustained, and said Finding of Fact 31 and Conclusion of Law 3 are disallowed, and said additional Findings of Fact 29 and 30 submitted by defendant, Metal Lubricants Co., are hereby adopted and entered as those of this Court.

[450] 3. That Claim 4 of said United States Letters Patent Reissue No. 24,017, dated June 7, 1955, is invalid and void.

4. That the complaint herein in Civil Action No. 56 C 1912 and the complaint herein in Civil Action No. 57 C 892 each be and the same hereby is dismissed upon the merits and with prejudice to the plaintiffs in each of said actions.

5. That each of the defendants in each of said actions recover its costs to be taxed and that execution be had therefor.

/s/ Edwin A. Robson,
United States District Judge.

June 29, 1962.

IN THE UNITED STATES COURT OF APPEALS

For the Seventh Circuit.

No. 13979 September Term 1962—April Session 1963

Devex Corporation *et al.*, *Plaintiffs-Appellants,* v. General Motors Corporation *et al.*, *Defendants-Appellees.*	Appeal from the United States District Court for the Northern District of Illinois, Eastern Division.

July 12, 1963

Before Duffy and Swygert, *Circuit Judges,* and Major, *Senior Circuit Judge.*

Duffy, *Circuit Judge.* These are two civil suits for infringement of Henricks' Reissue Patent No. 24,017 which were consolidated for trial on the common issue of validity. Claim 4 is the only claim at issue.[1] The District Court held Claim 4 of the patent in suit to be invalid in view of the indefiniteness of the claim, the prior art and prior public use.

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[1] Claim 4 reads:

"4. The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

The patent in suit relates to lubrication of metal surfaces in cold drawing and deforming operations in shaping steel to desired forms by dies, to reduce friction between the steel workpiece being drawn or shaped and the die, to avoid scoring and tearing of the metal being drawn and to avoid injury to the surface of the dies.

1a The patent in suit is the outcome of an application, Serial No. 665,905, filed April 29, 1946 by the patentee Henricks, which was abandoned in favor of a continuation-in-part application filed October 31, 1950, upon which was issued United States Patent No. 2,588,234, dated March 4, 1952, for which application for reissue was filed March 1, 1954, upon which Re. Patent No. 24,017 now in suit issued on June 7, 1955.

Claim 4, the only claim in issue, is identical to Claim 45 as allowed by the Patent Office in the 1946 application. April 29, 1946, the date when the 1946 application was filed, is therefore the record date of invention to which the patentee is entitled.

The patent in suit relates particularly to the lubrication of metal for drawing and forming operations. It concerns cold forming operations as opposed to hot forming operations. When metal is drawn or deformed, to transform a blank or workpiece into another desired shape, there is necessarily some movement between the surface of the blank and the surface of the die, and an accompanying generation of high pressures and temperatures. Adequate lubrication is essential. Unless suitable provision for lubricating the surfaces is made, tearing of the metal or galling of the dies results. The problem is most acute where difficult draws of ferrous metals are involved. Drawing operations require costly tools and dies. It follows that wear and abrasion are very important considerations in tool and die work.

Among the suggestions contained in the patent in suit is that of providing upon the surface of the work to be drawn, an integral phosphate coating and applying thereto a film of sodium tallow soap having borax distributed therein. It is contended that a solid meltable organic binding material mentioned in Claim 4 includes sodium tallow soap and that a solid inorganic compound mentioned in the claim includes borax.

Mohs' hardness scale is a known standard for indicating the relative hardness of materials. It is used in Claim 4 as a specification that the "solid inorganic compound" of the claim should not be hard enough to scratch the steel being drawn.

The prior art disclosed a number of lubricating schemes. These included the use of ordinary lubricating oils or lubricants containing finely divided infusible pigments such
2 as clay, lime, mica or graphite. Most of such schemes
were classified as "wet-film" lubricants which were wet and oily to the touch.

Later followed what is known as Singer's process, evolved in Germany and described in Singer United States Patent No. 2,105,015. Singer's scheme was to form a sponge-like coating, such as a phosphate, on the surface of the workpiece. The coating was not wet or flowable but was integral with the workpiece and could not be squeezed out in the drawing operation.

Phosphate coatings had been in use as early as 1914. These coatings had no lubricating value per se. They were, in fact, abrasive and caused tool and die wear even through superposed lubricants. The reason they were used in lubricating schemes was due to their ability to absorb and carry lubricant into a high pressure zone.

The next step forward in the art after the Singer process, was the development of the Gilron "Dry-Film" soap and borax lubricant. In this process, soap and borax were mixed with water and applied as an aqueous solution to the surface of the workpiece. The soap and borax coating was then dried by heat lamps or the like onto the surface of the workpiece. As drawn, it was a hard fixed film and stayed with the workpiece in the high pressure zones. No other lubricant was used.

The Gilron soap-borax coating on bare metal being transparent, permitted inspection of the workpiece and eliminated the abrasive phosphate. The Gilron process supplanted the Singer process in the shell case program of the United States Government during World War II.

In 1942 and thereafter until 1945, Henricks, the patentee of the patent in suit, was employed by Gilron Products Company and was familiar with the uses of soap-borax lubricants described in patents No. 2,469,473 and 2,530,837. The Gilron lubricating product for use in drawing steel was sold under the tradename "Drawcote" and was composed principally of sodium soap formed from tallow and palm oil, and of borax in proportion by weight of 10-33% soap to 67-90% borax.

Drawcote was sold in the form of a dry powder. Gilron Products Company obtained patents on Drawcote and its use. United States Patents No. 2,469,473 dated May 10, 1949, and No. 2,530,837 dated November 29, 1950, were
3 obtained upon the joint application of Gilbert H. Orozco, a partner of Gilron Products Company and his employee Henricks, the patentee of the patent in suit.

Drawcote was extensively sold and used in 1942 and 1943 in cold drawing of steel cartridge cases. In those years during World War II, there was a shortage of copper for making brass shell cases for the ammunition used in military and small arms weapons. The Government required manufacturers of shell cases to make them from steel by cold drawing and deforming. This manufacture of steel shell cases occurred largely during the period 1942-1944, after which copper again became available.

In the manufacture of shell cases, Gilron's Drawcote was able to replace the use of other lubricants such as lubricated copper coatings for steel and lubricated phosphate coating for steel.

In 1943, among those using a lubricated phosphate coating on steel in the operation of cold drawing steel 75 mm. shell cases, was Briggs Manufacturing Company, Detroit. That Company was then providing zinc phosphate coatings on steel blanks and applying thereover a sulphurized grease as a lubricant. About June 1943, Whitbeck of Gilron Products Company sold Drawcote to Briggs. By experimentation, Briggs found it could successfully carry out its cold drawing operation with the Drawcote soap-borax lubricant applied directly to the surface of the steel without the phosphate coating.

Plaintiffs admit the Gilron borax coating solved many drawing problems existing at that time and that even today, it is satisfactory for many draws. However, plaintiffs claim the process has its limitations and cannot do what the Henricks process does.

The Patent Office was fully advised of the nature and advantages of the Gilron process. Patent No. 2,469,473 was a file wrapper reference.

Several references are made in the briefs to the "German Process." This was developed prior to 1942. In this process, a phosphated workpiece is soaked as long as fifteen hours in an aqueous soap solution to form thereon by chemical interaction between the phosphate and soap, a water-insoluble soap film. A serious defect in this scheme was that the residual deposit was not water soluble and presented a difficult cleaning problem especially if the workpiece was to be electroplated.

4 Plaintiffs concede all of the elements which Henricks employed in Claim 4 in the patent in suit were old per se or in other combinations and have been available in

the art for some years. However, plaintiffs contend that the elements which Henricks selected were put together in a new way and achieved a new and unexpected result.

Plaintiffs claim that in the specific embodiment of Claim 4, the "phosphate coating" is the abrasive coating of the Singer process—a seeming retrogression in the art. The overlying film is a fixed one and the "solid meltable organic" constituent thereof is soap, the use of which had previously been found undesirable because of the cleaning problem. The "solid meltable inorganic compound" distributed therethrough, meltable at a temperature below the melting point of the abrasive phosphate coating and having a hardness not more than 5 on the Mohs' scale, is borax.

Plaintiffs argue that new and unexpected results flow from the conjunction of elements defined in the drawing process of the Henricks' patent; that tool and die life is greatly increased and severe drawing operations can now be performed which were previously impossible. Plaintiffs say there is a coaction during the high temperatures and pressures whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating; that the formation of insoluble organic materials is inhibited and there is no cleaning problem.

There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties.

There was also proof based upon commercial use and experience. Metal Forming & Coining Corporation tried a number of the prior art schemes including oils, waxes and drawing compounds, but the testimony showed that the only process that enabled this Company to cold form or coin small parts commercially is the combination in the Henricks' patent in suit. Testimony showed tool and die life was increased one thousand fold so that for given tools, three or four hundred thousand pieces were run where previously only three or four hundred pieces could be run. The Henricks' process made it possible to manufacture articles of superior quality at a much lower cost, the advantage being so marked in some cases as to spell the difference between success and failure on heavy reductions and difficult extrusions.

Defendants have engendered a great interest in an endeavor to have the Henricks' patent in suit declared invalid. The defense of this action has been conducted primarily by the attorneys for the Parker Rust Proof Company of Detroit. Parker supplies phosphate and lubricating materials to defendant General Motors, and is holding General Motors harmless. Parker solicited financial and legal help in this lawsuit from a number of its own competitors, and at least three of these competitors in manufacturing and selling phosphate and lubricating material, have given assistance in this case. Of course, these competitors had the right to give such assistance. However, such interest does indicate that the process covered in Claim 4 of the patent in suit is something of special value and merit and of great importance to those working in the field of cold drawing and deforming operations.

The trial court held Claim 4 too broad and lacking in specificity. The court stated the claim did not specify the kind of phosphate coating, the kind of organic binding, the kind of solid inorganic compound, as well as not specifying the amounts and relative proportions of any such items.

Pertinent on this point is a recent case before this Court, *Binks Manufacturing Company v. Ransburg Electro-Coat-*

ing Corporation, 281 F. 2d 252. In that case, the claim was made that the method claims of the patent there in suit did not satisfy the requirements of the patent statute (35 U. S. C. § 112) due to failure to specify voltage, spacing and liquids to which they are applicable. In overruling this argument we said at page 256: "The process claims define the specific steps of procedure and the specifications being addressed to those skilled in the art . . . need not recite details." We further stated at page 257: "There is no requirement that quantitative values for such factors as voltage, spacing and liquid characteristics be recited. The fact that experimentation or the exercise of judgment is necessary to adapt a patented process to
6 particular material or to obtain the particular results desired does not impair validity of the patent."

The fact that Claim 4 distinguishes from thirty-one references in a mature art, none of which anticipate, quite clearly establishes that the claim is not too broad and indefinite.

Patent claims should be generic in character and do not necessarily have to be specific. It is entirely proper to refer in Claim 4 to "a phosphate coating" without specifying which "phosphate coating."

The examples stated in the patent in suit and the specification teach the use of soap and borax over phosphate. They give formulas for the soap and borax and they identify the phosphate coating baths so that one skilled in the art could make them. The trial court was in error in holding that Claim 4 in the patent in suit was too broad and lacking in specificity.

It is fundamental that a patent is presumed to be valid and the burden of establishing invalidity rests on the party asserting it (35 U.S.C. § 282). It is well established the presumption of validity is not overcome except by clear and cogent evidence. *Radio Corporation of America* v. *Radio Engineering Laboratories, Inc.,* 293 U. S. 1, 7; *Hazel-*

tine Research, Inc. v. *Dage Electric Company, Inc.*, 7 Cir., 271 F. 2d 218, 224.

Defendants claim the Patent Office did not consider Singer Patent No. 2,105,015 nor British Patent No. 494,830 of 1938, and also several publications. However, the Singer process is described in British Patent No. 496,866 which was relied upon by the Patent Office during prosecution of the patent. Soap and borax dry-film lubricants are described in Patents No. 2,469,473 and 2,470,062. The former was relied upon as a reference in the Patent Office and the latter is referred to in the body of the specification of the Henricks' patent in suit.

The Patent Examiner had before him as prior art, all of the elements of Henricks' combination and found patentable invention in the combining of these elements. In fact, the Patent Office twice found invention over the prior art, first, when the original patent was granted, and second, when the reissue patent was granted. There is no showing in this case that the most pertinent prior art was not
7 considered by the Patent Office. On the contrary, we think the most pertinent art was cited and was found insufficient to negative patentability.

We cannot sustain the conclusion of law of the trial court that Henricks merely adopted the process which, in view of the prior art, was obvious to persons skilled in the art. The history of Parker Rust Proof Company demonstrates the process was not obvious. Parker Rust Proof has been a self-proclaimed leader in this field since 1914, but Parker remained uncertain as to how the problem should be solved until some considerable time after the Henricks' invention date.

Dr. Gibson was Technical Director for Parker in 1949 when they decided to develop a lubrication system. Dr. Gibson is now a professor of chemistry and qualified as one "skilled in the art." Parker, in 1949, was operating in the light of the prior art. Dr. Gibson was in charge of this development. They started in "basically with a literature search." They then worked with wet-film lubricants because, as Dr. Gibson testified, "We hadn't realized the true value of drying that particular film." Parker experimented with the formation of an organic film with phosphate as mentioned in the German references. Finally, Parker came to the Henricks' combination which it extolled in its literature as a new development of Parker.

The literature references which Parker now points to as teaching the invention, taught Parker nothing. Neither did the practices at Briggs Manufacturing Company. The substitution of soap and borax dry-film for the wet lubricant in the Singer process was, in fact, not obvious to Parker.

The Henricks' process was not, in fact, obvious to the defendants and the others now associated with them in the defense of this suit. None of them made the substitution of elements in the Singer process which, by hindsight, now appears to them to have been "obvious."

Although the learned trial judge found Claim 4 of the patent in suit to be invalid on all suggested grounds, we are of the view that the closest question in the case is the finding and conclusion of the trial court as to public use. This, in turn, refers to use at Briggs Manufacturing Company in 1943. All of the evidence on this point, except
patentee's own evidence, is contained in depositions. It
8 is apparent from Finding 14 that the Court relied upon
the testimony of Tousley and Brown which appeared in
depositions.

As the evidence relied on appears in depositions, we are in as good a position as the trial court to examine it and determine for ourselves whether the use at Briggs Manufacturing Company was a public use. *Kiwi Coders Corporation* v. *Acro Tool & Die Works*, 7 Cir., 250 F. 2d

562, 568; *Lewyt Corporation* v. *Health-Mor, Inc.*, 7 Cir., 181 F. 2d 855, 857.

The trial court did not hold the combination claimed in the patent in suit was publicly used in its entirety or that the valuable new result flowing from the combination was understood or achieved at Briggs. What the trial court decided was: "While it is arguable that the precise combination and coaction indicated by the patent are not found verbatim in the prior art, one armed with the knowledge of a worker skilled in that field could, the Court believes, have achieved the result covered by Claim 4 of the reissue patent." The trial court further recognized that the patentee in the patent in suit did make a stride forward in the art but apparently thought it was not sufficient to merit a patent monopoly.

There exists a well established rule that to invalidate a patent on the ground of public use, the prior public use must be established by clear and convincing proof.

In *Smith* v. *Hall*, 301 U. S. 216, 233, the Court refers to the rule as ". . . the heavy burden of persuasion which rests upon one who seeks to negative novelty in a patent by showing prior use." In *Radio Corporation of America* v. *Radio Engineering Laboratories, Inc.*, 293 U. S. 1, 7, the Court cites with approval a number of cases for the proposition, the burden of proof is upon the party setting it up and "every reasonable doubt should be resolved against him." Indeed, the late Chief Judge Learned Hand stated the rule in even more emphatic language in *Block* v. *Nathan Anklet Support Co., Inc.*, 2 Cir., 9 F. 2d 311, 313, ". . . but in such cases probability, even extreme probability, is not enough. The proof must be as absolute as in a criminal conviction; indeed, the rule comes nearly to this, that one must have contemporaneous records, verbal or structural."

In June 1943, when Henricks came to the Briggs Manufacturing Company in behalf of the Gilron Products Draw-

cote, a number of experiments were conducted which led
9 to the changeover from the Singer process to Gilron.

Each blank tested was subjected to six consecutive forming operations. Henricks experimentally ran two baskets of blanks with a phosphate undercoat. There were approximately one hundred test pieces in the two baskets, a very small amount considering the large volume being handled. No further notice was taken of the pieces themselves, and they were enveloped in the big flow of material that was in process. The success of the process was in no way there demonstrated. This rather minor incident at Briggs did not lead to the use of the patented combination by Briggs. In fact, Briggs abandoned the use of phosphate entirely. The temporary and almost casual experiment with soap and borax went into the discard.

After the decision in this case by the trial court, Henricks received information that the United States Government Arsenal at Joliet, might have a report which would show the true facts as to the Briggs operation. Inquiry there revealed nothing. The inquiry was forwarded to Frankfort Arsenal. Nothing was found there, but when the inquiry was forwarded to the Record Files in Missouri, a report was located. Henricks was permitted to read the report and make extracts therefrom.

Plaintiffs filed a motion to amend the findings of fact and for a new trial. The Court denied the motion. This was understandable where the Court considered the patent to be invalid on all grounds urged. However, as our view is that the turning point of this case is the question of alleged public use at Briggs, we think the report should have been considered, especially that part which deals with the initial experimentation with the Gilron process. It would appear reasonable that if there had been any significant or more than experimental use of soap and borax over phosphate in cartridge-case manufacture at Briggs, it would surely have appeared in the report which the Briggs officials made to the army ordnance.

Another convincing argument in favor of plaintiffs' contention is that if soap and borax had been applied over phosphate in regular production, there would necessarily have been a tank for phosphate solution and a separate tank for the soap and borax solution arranged in series so that the baskets containing the blanks or workpieces would move successively through the two solutions. There is no claim that any such procedure was followed.

10 We hold there is no sufficient showing of prior public use and that Claim 4 of the patent in suit is valid. The case will, therefore, be remanded to the District Court for further proceedings consistent with this opinion, as the question of validity only was passed upon in the previous trial.

Reversed.

[11] UNITED STATES OF AMERICA, ss.

The President of the United States of America.

(Seal)

To the Honorable the Judges of the United States District Court for the Northern District of Illinois, Eastern Division, Greeting:

Whereas, lately in the United States District Court for the Northern District of Illinois, Eastern Division before you, or some of you, in a cause between Devex Corporation, et al., Plaintiffs, and General Motors Corporation, et al., Defendants District Court Nos. 56-C-1912 and 57-C-892, a judgment was entered on the twenty-ninth [12] day of June, 1962, as by the inspection of the transcript of the record of the said District Court, which was brought into the United States Court of Appeals for the Seventh Circuit by virtue of an appeal by Devex Corporation, et al. agreeably to the act of Congress, in such case made and provided, fully and at large appears.

[13] And Whereas, in the term of September, in the year of our Lord one thousand nine hundred and sixty-two, the said cause came on to be heard before the said United States Court of Appeals for the Seventh Circuit, on the said transcript of record, and was argued by counsel.

On Consideration Whereof, it is ordered and adjudged by this Court that the judgment of the said District Court in this cause appealed from be, and the same is hereby, Reversed, with costs, and that this cause be, and it is hereby Remanded to the said District Court for further proceedings consistent with the opinion of this Court filed this day, as the question of validity only was passed upon in the previous trial.

Friday, July 12, 1963.

And afterwards, to-wit, on the twenty-sixth day of July, 1963, there was filed in the office of the Clerk of this Court a petition for rehearing, which said petition for rehearing was denied on the fourth day of September, 1963, and further that Plaintiffs-Appellants, Devex Corporation, et al. recover against the Defendants-Appellees, General Motors Corporation, et al. the sum of one thousand, six hundred fifteen and sixty-eight/100ths Dollars ($1,640.68) for docketing and printing costs herein expended with direction to award execution thereof.

[14] You therefore are hereby commanded that such further proceedings be had in said cause, as according to right and justice and the laws of the United States, aught to be had, the said judgment notwithstanding.

Witness, the Honorable Earl Warren, Chief Justice, of the United States, the sixteenth day of January, in the year of our Lord one thousand nine hundred and sixty-four.

Kenneth J. Carrick,
(Seal) *Clerk of the United States Court of Appeals for the Seventh Circuit*

By: Thomas F. Hauble,
Deputy Clerk.

Endorsed: United States Court of Appeals for the Seventh Circuit,

No. 13979. September Term, 1962. Devex Corporation, et al. vs. General Motors Corporation, et al. Mandate.

OFFICE OF THE CLERK
SUPREME COURT OF THE UNITED STATES
WASHINGTON, D.C. 20543

January 6, 1964

RE: GENERAL MOTORS CORPORATION, ET AL.
v. DEVEX CORPORATION, ET AL., No. 618,
OCT. TERM, 1963

Dear Sir:

The Court today denied the petition for writ of certiorari in the above-entitled case.

Very truly yours,

JOHN F. DAVIS, Clerk
By

Assistant

George N. Hibben, Esq.
Hibben, Noyes and Bicknell
332 South Michigan Avenue
Chicago, Illinois

DISTRICT COURT, N.D. ILLINOIS, E. DIV. DEVEX CORPORATION ET AL. V. HOUDAILLE INDUSTRIES, INC.

57C892 **Decided Dec. 15, 1965**

Robson, District Judge (orally)

This cause is before the Court on remand for the determination of the issue of infringement by defendant, Houdaille Industries, Inc., of claim 4 of Henricks' reissue patent No. 24,017. Counter-motions for summary judgment have been filed.

Plaintiffs have renewed their motion for summary judgment on the issue of infringement, and Houdaille has filed a motion for summary judgment.

As plaintiffs point out, the Court on the denial of [367] their original motion for summary judgment on March 10, 1965, indicated a willingness to reconsider its denial, after the taking of additional discovery.

Since that time plaintiffs have taken the deposition of Leslie C. Borchert, and the deposition of patentee Henricks has also been taken. The Court has carefully examined both depositions. It finds that in the main they are directed to an undermining of the ruling upholding validity, and to refute the conclusion that there is no eradication or alleviation of the problem of cleaning the extruded bumper prior to plating.

The issue of infringement seems to turn on the breadth of the construction to be accorded claim 4. Defendant maintains that it is to be narrowly construed in that the Court of Appeals sustained the novelty and validity of the claim on the basis of the coaction of soap, borax, and phosphate, resulting in the formation of no insoluble zinc stearate. Since defendant's proof shows continued existence of zinc stearate, it does not infringe.

Plaintiffs assert that the claim should not be so [368] limitedly construed and that infringement exists although a negligible amount of zinc stearate still is formed. Plaintiffs maintain that the word "inhibits", as used by the Court of Appeals, does not mean complete elimination of zinc stearate, but only that the amount there is substantially decreased. The Court concludes that plaintiffs' position is the sound one.

Claim 4 reads:

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

The critical words in the discussion of this claim by [369] the Court of Appeals are at page 237:

> "There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties."

Plaintiffs challenge defendant's interpretation of the word "inhibited" and contend it means, as the dictionary indicates, a decrease, repression or retardation, and not a complete elimination or obliteration of the water insoluble residue of zinc stearate.

Defendant believes that the Court of Appeals' holding of validity centered on the novelty residing in the complete elimination of the water insoluble zinc stearate residue, which rendered unnecessary the electrolytic bath of the metal bar before the application of a chrome finish. [370] Plaintiffs negate the necessity for this Court's finding that defendant's process utilizes high temperatures and pressures so as to cause the formation of amorphous glassy materials. Claim 4 has no such element. It is simply an explanation in the Court of Appeals' description of the conditions under which the coaction obtains.

Defendant Houdaille's motion for summary judgment is predicated principally upon the contention that the co-action on which the Court of Appeals found inventiveness (a soap-borax fixed film over an integral phosphate coating) was not disclosed in the earlier but abandoned application of Henricks filed April 29, 1946, and did not appear until the application for the continuation-in-part filed October 31, 1950, which application matured into the original Henricks Patent No. 2,588,234, and later into the Reissue No. 24,017.

Defendant asserts it had used the process here charged to infringe as early as April 25, 1949, more than one year prior to the date of the application for the continuation-in-part (which process produced no such "new and unobvious results") and defendant therefore has "inter- [371] vening rights" (Muncie Gear Co. vs. Outboard Co., 315 U.S. 759).

Plaintiffs are therefore stopped, Houdaille asserts, from claiming infringement; or, defendant should be held not to infringe because it obtains no new and unexpected results, nor does it use the high pressures required by plaintiffs' process. Defendant would restrict plaintiffs to Henricks' October 31, 1950, filing date.

Defendant "submits that the infringement issue need not be tried since defendant's justification of its right to use the process complained of disposes completely of that issue." Further, it says it has practiced its process under conditions that do not result in the "new coaction" nor achieve any of the "new and unexpected" results attributed to such claimed process by the Court of Appeals.

The Court is of the opinion that on this remand it is not within its province to reassess the validity of the patent as it might be affected by the defense of prior public use, or to limit the claim's breadth of construction to processes wherein there is complete absence of zinc [372] stearate formation, rather than a substantial diminution thereof. The Court of Appeals found there was " . . . no sufficient showing of prior public use and that claim 4 of the patent in suit is valid."

The Court concludes that no genuine issue of fact remains as to Houdaille's infringement of claim 4. Plaintiffs have clearly demonstrated by the answers of defendant to the interrogatories that defendant's process responds to each element of the claim.

The defendant's attempt to avoid a finding of infringement by reading the claim restrictively to a scope where the process completely prevents the formation of zinc stearate is not warranted by the language of the Court of Appeals, or by the phraseology of the claim itself.

Plaintiffs dispute defendant's contentions in respect to the existence of non-infringement because the defendant's practice of the process does not result in the benefit found by the Court of Appeals to warrant a finding of validity. Plaintiffs point out that an imperfect infringement nevertheless constitutes an infringement. (Ekco Products [373] Co. *vs.* Chicago Metallic Manufacturing Co., 321 F. 2d 550; Colgate-Palmolive-Peet Co. *vs.* Lever Bros. Co., 90 F. 2d 178, 194, both Seventh Circuit Court of Appeals opinions.) That court in the Ekco Products Co. case, supra, said, at page 555:

> "Imperfect practice of the patented process does not avoid infringement."

The Court of Appeals found that the patent taught the use of soap and borax over phosphate (321 F. 2d 234, at 238). The brief of the plaintiffs points out several quotations from the abandoned application supportive of the process claimed in claim 4 and asserted to be infringed. Further, defendant points out that the phrasing of claim 4 has remained the same from the beginning (with the exception of the word "solid" being substituted for the word "hardened") and that there was never a contention that the original abandoned application did not support that claim.

Plaintiffs' final brief stresses the finding of the Court of Appeals that patentee's record date of invention is [374] April 29, 1946, since claim 4 is identical to claim 45 allowed by the Patent Office (321 F. 2d 235) and defendant may not now assert the October 30, 1950 date.

Defendant counters that the abandoned 1946 application affords no adequate basis for construing application claim 45 to cover a fixed film of soap and borax over a phosphate coating, and in giving claim 4 this construction the Court of Appeals said nothing with regard to whether claim 45 would also support such construction. Further, defendant deems the quoted Court of Appeals statement to be obiter dictum because not based on any evidence or finding before this Court.

It is evident from Henricks' testimony on the deposition that he believes the examples given in the abandoned application are construable to cover claim 4 so as to justify his claim to the earlier date, precluding the public use defense of defendant. The examples given were "fully equivalent with soap and borax in the sense of the invention."

He said he had not gone into the "absoluteness" of [375] the prevention of zinc stearate but the cleaning operation is easier with a soap and borax combination than with straight soap. The formation of zinc stearate is greatly reduced, although there is some formation of it. The cleaning process would be "simplified," and cleanability is "enhanced".

Whether he had the Court of Appeals language and these motions for summary judgment in mind or not, he stated on his deposition that "in either event, whether soap or soap-borax is used, there is a residual coating containing some zinc stearate, but it is inhibited but not completely prevented."

Throughout the deposition Henricks states that much less insolubility remains when soap and borax are used rather than straight soap. With soap and borax there is less zinc stearate and better cleanability. He said one could not prepare for plating without an acid dip. He felt that Borchert was "maneuvered into a completely meaningless affidavit" in which three-quarters of his test samples were not prepared for plating. He said that no plater plates without acid. If plating is not done cleaning is unimportant.

[376] He said, "I have never tried to indicate that there was any magic by which we fully inhibit, 100 per cent inhibit, the formation of zinc stearate." "Where you go to high pressure on bumpers you need soap with borax, and need the phosphate to reinforce the borax. The absence of borax has caused trouble in the industry of cold extrusion because soap alone will not draw." He states in his original application he had a drawing example of a phosphate covered with a soluble stearate and a borate combination dried on and he also had references to borax as a pigment and soap as a binder in the original.

He said the cleaning was improved as he pointed out in the original application because of the borax emulsification.

The language of Beach *vs.* Inman et ao., 75 F. 840, affirmed 78 F. 923, seems here appropriate:

> "When a patentee has obtained a final decree after years of arduous litigation, it should be final in reality as well as in name. It should guard his rights against all intruders; it should be a document of the

> utmost [377] value, and not a mere brutum fulmen. If, after having passed the ordeal of the courts, patents are still to be scanned with a hostile microscope, and the inartistic and, perhaps, thoughtless nomenclature of the description is to be substituted for the machine itself, an invitation is extended to infringers to begin again the work of spoliation under a new disguise. . . . When the actual invention is made clear, the inventor should not be impaled upon a sharp construction of his ill-chosen adjectives. An infringer should not escape because he is able to 'evade the wording of the claims.' "

In determining the instant issue the statement in Midland Steel Products Co. *vs.* Clark Equipment Co., 174 F. 2d 541, is pertinent. There at page 545, it was said:

> " . . . an element cannot be read into a claim in order to make out a case of noninfringement . . ."

Defendant's attempt to read into the claim a requirement that there be complete elimination of the formation of [378] zinc stearate is not warranted by the wording of claim 4. This is not an instance of expanding "by the doctrine of equivalents to embrace particulars excluded by the prosecutional history of the patent." (Jacwil Mfrs. *vs.* Batesville Casket Company, 311 F. 2d 38.

As plaintiffs point out, there can be little question that defendant's practice responds to Claim 4, so as to constitute infringement thereof. The first phrase, "The process of working ferrous metal", is covered by the interrogatory answers that defendant makes automobile bumpers at its Chicago and Huntington, West Virginia divisions.

The next phrase, "which comprises forming on the surface of the metal a phosphate coating", is also covered by an answer to an interrogatory which states, "the bumper stock is immersed in or sprayed with a phosphate coating bath prior to the drawing operation so as to form thereon a phosphate coating".

This fact is also stated in the Borchert deposition at page 39. The next phrase of claim 4, "and superim- [379] posing thereon a fixed film of a composition comprising a solid meltable organic binding material", is covered by the Borchert deposition, page 39, and answers to interrogatories 3 and 4.

The next phrase of claim 4, "containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale", is covered by answers to interrogatories 5 and 12, and the Borchert deposition pages 39-40. The final phrase, "and thereafter deforming the metal", is covered by the answer to interrogatory 1.

The Court therefore concludes that the plaintiffs' renewed motion for summary judgment should be granted and defendant's motion for summary judgment denied; that there should be a finding of infringement by the defendant of claim 4 of the Reissue Patent No. 24,017, upon the basis of defendant's answers to the interrogatories and the depositions heretofore filed.

In view of the Court's conclusion in respect to the [380] motions for summary judgment it follows that defendant's motion for production of documents is also denied.

That will be the order of the Court.

DEVEX CORPORATION et al., Plaintiffs-Appellees,

v.

HOUDAILLE INDUSTRIES, INC., Defendant-Appellant.

No. 15732

United States Court of Appeals
Seventh Circuit.
July 12, 1967.

Before MAJOR, Senior Circuit Judge, and SWYGERT and CUMMINGS, Circuit Judges.

MAJOR, Senior Circuit Judge.

This appeal is a continuation of litigation of long duration. On November 13, 1956, plaintiffs filed their complaint against General Motors and Metal Lubricants Company for infringement of Henricks Patent Re. 24,017, dated June 7, 1955. On May 22, 1957, plaintiffs filed a companion case against the instant defendant (Houdaille Industries, Inc.), for infringement of the same patent. In both cases plaintiffs relied solely upon Claim 4. The cases were consolidated on the common issue of validity, and Judge Robson held the Henricks patent invalid. On appeal, this Court reversed, held the claim valid and remanded the case for further proceedings consistent with the opinion. Devex Corp. et al. v. General Motors Corp. et al., 7 Cir., 321 F.2d 234, cert. den. 375 U.S. 971, 84 S.Ct. 490, 11 L.Ed. 2d 418. Upon remand, the case against Metal Lubricants Company was dismissed by consent and that against General Motors, on motion by plaintiffs, was transferred to the District of Delaware.

In the instant case plaintiffs moved for a summary judgment that defendant had infringed Claim 4 of the Henricks patent, which was first denied. After further deposition testimony was taken, plaintiffs renewed their motion and on February 17, 1966, it was allowed. The case is here on defendant's appeal from this judgment.

On June 23, 1965, prior to plaintiffs' renewed motion for summary judgment, defendant, with leave of the Court, filed an amended answer setting up additional defenses, including (a) license, (b) laches, (c) prior public use by defendant, (d) shop right, (e) patent misuse, (f) intervening rights, (g) lack of continuity between the original patent and the preceding abandoned application and (h) release. The amended answer allegedly was based upon facts ascertained from the May 17, 1965 deposition of Henricks. In connection with its amended answer defendant moved for the production of documents, which was denied.

The Court in its summary judgment decreed infringement of Claim 4, enjoined defendant from further infringement and referred the case to a Special Master to hear and submit to the Court findings on the issue of damages. The judgment also provided for a determination by the Master of the affirmative defenses invoked by defendant. On March 3, 1966, defendant's motion to vacate the summary judgment was denied.

The companion case of General Motors, transferred to the Delaware District as previously shown, was heard by Judge Caleb M. Wright on plaintiffs' motion for summary judgment. In a well reasoned opinion the Court concluded that summary judgment was inappropriate and denied such relief. Devex Corp. et al. v. General Motors Corp., 263 F.Supp. 17. Concerning the Delaware case, defendant on brief states, "So far as infringement is concerned, the issues there are substantially identical with those involved here." Plaintiffs take no issue with this statement, in fact do not even mention the case although it was decided more than two months prior to the date on which plaintiffs' brief was filed in this Court, with the same counsel representing plaintiffs in both cases.

In the interest of brevity, we refer to our previous opinion written by Judge Duffy, for a history of plaintiffs' patent, its purpose and scope, the claim relied upon and the reasoning on which validity was sustained.

At the inception we are met with plaintiffs' challenge that the order under attack is not appealable and should be dismissed. Defendant responds that we have jurisdiction under Par. (a) (1) or (4) of Sec. 1292, Title 28 U.S.C.A. The former provides jurisdiction of an appeal from an order granting an injunction, the latter from judgments for patent infringement which are final except for accounting. Plaintiffs cite a number of cases in support of the point that "an appeal from an interlocutory order granting an injunction brings up for review nothing but the propriety of granting the injunction," and such appeal "does not bring up for review those parts of the decree which affect only the reference to a Master and bear no necessary relation to the merits of the injunction."

In Loew's Drive-In Theatres, Inc. v. Park-In Theatres, Inc., 1 Cir., 174 F.2d 547, 550, the Court stated:

> "Our jurisdiction over this cause of action on appeal, however, is another matter. For although injunctive relief is granted in the judgment appealed from and we have appellate jurisdiction over such judgments under 28 U.S.C.A. Sec. 1292 (1) even though interlocutory, we have jurisdiction to review only that part of such judgments as have to do with the injunctive relief afforded and no other."

In Racine Engine & Machinery Co. v. Confectioners' Machinery & Mfg. Co., 7 Cir., 234 F. 876, 878, speaking to the same point, this Court stated:

> " * * * if and after the patent is sustained, infringement found and injunction awarded, upon appeal

> this court may finally determine the validity of the patent, and its determination is binding on the District Court."

[1-3] These and other cases cited by plaintiffs recognize that a court with jurisdiction to hear an appeal from an injunction order must necessarily have jurisdiction to consider the propriety of the premise upon which the injunction issued. As applied to the instant case, our authority to consider the propriety of the injunction carries with it the authority to consider the infringement issue upon which the injunction issued. It may be that we are without authority to consider the affirmative defenses interposed by defendant prior to the entry of the summary judgment and referred to the Master for decision. We need not be concerned in this regard, however, because, assuming we have such authority, we would not be disposed to exercise it in the absence of a ruling by the court below on such issues. We hold that we have jurisdiction of the appeal from the injunction order and of the infringement issue upon which it is predicated.

[4] Plaintiffs also contend that defendant has no standing to complain of the order enjoining it from further infringement, on the basis that it consented to and openly invited its entry, thereby waiving any right to complain of error. We see no reason to cite or discuss the cases cited in support of this contention. They are without application to the facts of the case.

In this connection plaintiffs place much emphasis on the assertion that the judgment order was proposed by defendant. True, it was so labeled, but there clearly emerges, on a confusing record, the fact that defendant did not consent to or invite the order, particularly that part which enjoined it from further infringement. Plaintiffs attached to their original and again to their renewed motion for summary judgment a form of proposed judgment. The Court in an oral decision granted plaintiffs' renewed motion and, at the Court's suggestion, plaintiffs submitted a revised form of judgment. On February 16, 1966, defendant served on plaintiffs a "Notice of Motion," notifying them that defendant "*without waiving any rights* will present the attached draft of a judgment order." The February 17 order alleged to have been proposed by defendant was presented to the Court, "approved as to form."[1]

Defendant in no way consented to the injunction or waived its opposition thereto; its activities were confined to limitations on the forms of judgments submitted by plaintiffs. Moreover, defendant subsequently attacked the entire judgment order by its motion to vacate, which was denied March 3, 1966. Plaintiff's argument on this phase of the case is entirely without merit.

[5] Preliminary to any discussion of the narrow issue for decision, we must keep in mind that it is not within our province to make a determination on factual issues. The sole question is whether plaintiffs under Rule 56(c), Federal Rules of Civil Procedure, were entitled to a summary judgment and thereby precluded defendant of the right to a hearing. The citation of only a few of the many cases which have announced the criterion to be employed in resolving such question will suffice.

In Poller v. Columbia Broadcasting System, Inc., et al., 368 U.S. 464, 467, 82 S.Ct. 486, 488, 7 L.Ed.2d 458, the Court stated:

> "This rule authorizes summary judgment 'only where the moving party is entitled to judgment as a

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[1] Neither on brief nor in their appendix offered in support thereof do plaintiffs reveal that defendant's order was proposed "without waiving any rights" and was "approved as to form" only.

> matter of law, where it is quite clear what the truth is, * * * [and where] no genuine issue remains for trial * * * [for] the purpose of the rule is not to cut litigants off from their right of trial by jury if they really have issues to try.'"

The Court further stated (page 473, 82 S.Ct. page 491):

> "We look at the record on summary judgment in the light most favorable to Poller, the party opposing the motion, and conclude here that it should not have been granted."

In National Screen Service Corp. v. Poster Exchange, Inc., 5 Cir., 305 F.2d 647, 651, the Court stated:

> "The rule should be invoked cautiously in order to allow a full trial where there is a bona fide dispute of facts between the parties. Summary judgment should be granted only where the moving party is entitled to judgment as a matter of law, *where it is quite clear what the truth is*, when no genuine issue remains for trial, and it is not the purpose of the rule to deny to litigants a right of trial if they really have issues to try. [Citing cases.] It is no part of the duty of the Court to decide factual issues, but only to determine whether there are factual issues to be tried [Citing case.]
>
> " * * * A long line of cases have held that summary judgment should not be granted if there is the 'slightest doubt' as to the facts; which is actually another way of stating that there is no genuine issue as to any material fact. The fact that it may be surmised that the party against whom the motion is made is unlikely to prevail at the trial is not sufficient to authorize summary judgment against him."

[6] Among other cases which have emphasized that caution is to be exercised in granting summary judgment are two of this Court. American Security Co. v. Hamilton Glass Co., Inc., 7 Cir., 254 F.2d 889, 892, and Technograpn Printed Circuits, Ltd. v. Methode Electronics, Inc., 7 Cir., 356 F.2d 442, 446.

After much study of the voluminous record, we conclude that the Court erred in allowing plaintiffs' motion for summary judgment. We think defendant is entitled to a trial on the infringement issue, as well as any relevant issue raised by its amended answer. While Judge Robson in his opinion (not published) discusses the restrictions placed by this Court on Claim 4 as a basis for our holding of validity, it seems to us that he mistakenly based his conclusion on a literal reading of the claim. In his opinion he states, "As plaintiffs point out, there can be little question that defendant's practice responds to Claim 4, so as to constitute infringement thereof." Following this statement he analyzes the claim element by element, concludes that defendant's process responds to each of said elements and states, "The Court therefore concludes that the plaintiffs' renewed motion for summary judgment should be granted * * *; that there should be a finding of infringement by the defendant of Claim 4 of the Reissue Patent No. 24,017, upon the basis of defendant's answers to the interrogatories and the depositions heretofore filed."

Concerning the holding of Judge Robson, plaintiffs on brief state:

> "* * * he held that Houdaillle's attempts to avoid a finding of infringement by reading the claim restrictively was not warranted by the language of that opinion [321 F.2d 234], or by the language of the claim itself."

For reasons subsequently shown, we think this is a fallacious approach to the infringement issue. Our previous decision requires that the claim in suit be given a narrow and restricted construction.

We need not give any consideraton to the prior art which Judge Robson in the first hearing considered and upon which he found Claim 4 invalid. In our previous decision (321 F.2d 234), reversing his holding of invalidity we stated (page 236):

> "Plaintiffs concede all of the elements which Henricks employed in Claim 4 in the patent in suit were old *per se* or in other combinations and have been available in the art for some years. However, plaintiffs contend that the elements which Henricks selected were put together in a new way and achieved a new and unexpected result."

Thus, it was conceded that all of the elements of the claim were old in the art, but plaintiffs sought to uphold validity upon the basis that such elements "were put together in a new way and achieved a new and unexpected result." It was solely on this basis that this Court sustained validity and reversed the District Court. In this connection we stated (page 237):

> "Plaintiffs argue that new and unexpected results flow from the conjunction of elements defined in the drawing process of the Henricks' patent; that tool and die life is greatly increased and severe drawing operations can now be performed which were previously impossible. Plaintiffs say there is a coaction during the high temperatures and pressures whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating; that the formation of insoluble organic materials is inhibited and there is no cleaning problem.

> "There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties."

We further pointed out that there was testimony that by use of the process "tool and die life was increased one thousand fold" and that the process made it possible "to manufacture articles of superior quality at a much lower cost."

It is difficult to discern how plaintiffs can contend with any plausibility that defendant is an infringer, based upon a literal reading of the claim. In the previous case plaintiffs urged as a ground for sustaining validity a narrow and restricted application of the "specific embodiment of Claim 4." On brief they state:

> "Specifically, there is a coaction during the high temperatures and pressures of the drawing process whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating. The formation of insoluble organic materials is inhibited and there is no cleaning problem."

They also relied on "new and surprising results" to meet the test of Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 71 S.Ct. 127, 95 L.Ed. 162. Thus, having obtained a decision of validity on a narrow and restricted basis, they now contend, inconsistently we think, that the claim must be applied literally to defendant's alleged infringing process. Such a construction would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results.

[7] Judge Wright of the Delaware Court in the *General Motors* case (263 F.Supp. 17) followed the decision of this Court in sustaining the validity of Claim 4 (that here involved) but disagreed with Judge Robson in allowing plaintiffs' motion for summary judgment. In his opinion he pointed out numerous unresolved factual issues which formed the basis for his denial of plaintiffs' motion for a summary judgment. Without restating the issues which he discussed, it is significant to note that he refused, on the issue of infringement, to give effect to a literal reading of Claim 4. Instead, he held that the restrictions placed upon the claim by this Court in sustaining validity must be taken into account. In so doing he stated (page 25):

> " * * * the construction of a claim when its validity is contested controls the construction of that same claim when its infringement is alleged. The patentee cannot urge a restrictive interpretation of his claim to avoid invalidity and then an expansive interpretation to ensnare infringers."

This principle has been recognized by this Court. In Fife Mfg. Co. v. Stanford Engineering Co., 7 Cir., 299 F.2d 223, 226, we stated:

> "It is well settled that a patent owner may not apply a narrow construction to his claim to avoid the prior art and then apply a broad construction to include an accused device."

See also Wire Tie Machinery Co. et al. v. Pacific Box Corp. et al., 9 Cir., 107 F.2d 54, 55.

The "new and unexpected result" which plaintiffs urged upon this Court in their argument in behalf of validity, to which we gave recognition, certainly was not revealed by a literal reading of Claim 4. In fact, we can surmise with some assurance that if a literal reading of the claim had been relied upon, we would have affirmed the District Court in its holding of invalidity in view of the prior art. The patentee's thesis of "new and unexpected result" was based upon the addition to the patent specifications of Examples XIX and XX, filed October 31, 1950, in connection with his continuation-in-part application, Serial No. 413,-490. These Examples, which gave formulas for soap and borax over phosphate, were included in the patent issued March 4, 1952 and, as stated by plaintiffs on brief, "By issuance of this patent, the Henricks applications were first made available to the public and thereby, for the first time, became public knowledge."

Based upon Examples XIX and XX, the Friedberg tests were made, which formed the basis of this Court's statement that there was evidence of a "new coaction between the soap, borax and phosphate during the drawing process." Judge Wright on this point stated (page 25):

> "The Friedberg tests involved draws conducted under high pressures involving severe deformation of the metal, whereas the GM operation involves much lower pressures. And Henricks, the patentee, himself stated that it is a high pressure operation generating sufficient heat to thaw the meltable pigment which forms a part of his invention. The Court requires the aid of expert testimony to determine whether these differences are, or are not, important."

[8] In the instant case, as in General Motors, there is evidence that the patentee's process recognized by this Court required "extreme temperatures and pressures of from 100,000 to 250,000 pounds Hertz stress." There is also evidence that defendant's alleged infringing process requires

pressures of only "10 to 25,000 pounds Hertz stress." Moreover, the tests relied upon were made in the drawing of wire rods. Plaintiffs had the burden of proof upon a disputed issue as to whether the same result would have been obtained in the drawing of defendant's alleged infringing automobile bumpers.

While these issues are not all inclusive, we think they alone are such as to negate the propriety of a summary judgment.

We might with propriety conclude our opinion at this point. Even so, we think we should discuss the issue of "intervening rights," relied upon by defendant as a defense to the charge of infringement. As already noted, defendant on June 23, 1965, after having first obtained leave of the Court, filed an amended answer setting forth a number of affirmative defenses. (Of such defenses only "intervening rights" is argued here.) Plaintiffs on brief refer to these defenses as "last minute affirmative defenses," even though the amended answer was filed prior to the filing of plaintiffs' second motion for summary judgment. No attack was made upon such defenses by motion to dismiss the answer or otherwise.

Judge Robson in his bench discussion stated:

> "The Court is of the opinion that on this remand it is not within its province to reassess the validity of the patent as it might be affected by the defense of prior public use."

This statement no doubt was based upon the finding of this Court in its previous opinion that the patentee's record date of invention was April 29, 1946, since Claim 4 is identical to Claim 45 allowed by the Patent Office, and defendant may not now assert the October 31, 1950 date. (321 F.2d 234, 235.)

It is not claimed that our holding relative to public use in connection with the issue of validity is *res adjudicata* with reference to the defense of intervening rights to the charge of infringement. The District Court did not so decide but instead referred the issue to the Master for decision. In doing so, the Court stated:

> "In view of the findings here, I think the affirmative defenses, and I am aware of them, will more or less fall by the wayside and it would be a matter of a reference to the Master, but certainly I am willing to consider any and all matters which may be concerned."

We doubt the propriety of such reference, see Prepo Corp. v. Pressure Can Corp., 7 Cir., 234 F.2d 700, 704, but need not dwell on the point inasmuch as the judgment is to be reversed.

On the state of the record shown, we think it plain that the issue relating to the defense of "intervening rights" remains before the Court and must be resolved on the record made in this case, which is quite different from that previously before this Court.

There is evidence that defendant commenced use of the alleged infringing process as early as April 25, 1949, more than one year prior to the filing of the continuation-in-part application upon which was issued Patent No. 2,588,234, dated March 4, 1952, from which the reissue patent in suit was issued June 7, 1955. Thus, defendant contends that the coaction on which this Court found inventiveness (a soap-borax fixed film over an integral phosphate coating) was not disclosed by Henricks in his earlier but abandoned application; in fact, it was first disclosed in his continuation-in-part application filed October 31, 1950, which matured into the patent in suit.

[9] As previously shown, "the new and unexpected result" which plaintiff urged upon this Court followed the disclosures in Examples XIX and XX, first made a part of the patent

specifications filed October 31, 1950. In fact, Henricks on deposition so admitted. He was asked, "What I am trying to understand, Mr. Henricks, is this: you had no soap-borax over phosphate in your abandoned application?" and he answered, "Correct." Plaintiffs attempt to bridge this gap by arguing that in the abandoned application the "glyceryl borate" was "fully equivalent" to the soap and borax. Whether Henricks' 1946 disclosure was the equivalent of that made in 1950, upon which he obtained an adjudication of validity, is an issue of fact. Graver Tank & Mfg. Co., Inc., et al. v. Linde Air Products Co., 339 U.S. 605, 609, 70 S.Ct. 854, 94 L.Ed. 1097. Moreover, the issue is one for expert testimony.

Also material to the issue under discussion is a matter presented by defendant as newly discovered evidence in connection with its motion to vacate the judgment. On October 29, 1951, Henricks filed with the Canadian Patent Office his application for a patent entitled "Method of Drawing Metal," which was allowed. In the Canadian application Henricks stated that he was entitled to the October 31, 1950 United States filing date under Treaty or Convention Rights of Applicants as it "relates to all claims," because the United States 1950 application was " * * * the first application for patent for the said invention filed in any country by him or anyone claiming under him."

The specifications, including Examples XIX and XX, and the claims, including Claim 4 in suit, of the Canadian patent were identical with the 1950 United States application. Thus, Henricks represented to the Canadian Patent Office that his 1950 United States application disclosed for the first time the soap-borax-over-phosphate, the premise upon which this Court sustained validity.

Plaintiffs on brief make no denial of the facts just recited relative to the proceedings in the Canadian Patent Office. They state:

> "On October 29, 1951, Henricks filed a corresponding Canadian patent application. That application made reference to the continuation-in-part application filed in the United States on October 31, 1950 *for the purpose of obtaining a prior date of invention* under the International Convention and Canadian law insofar as the material in the continuation-in-part application *may* have been added as '*new matter*'. As to that material which *may not* have been added as '*new matter*' in the continuation-in-part application, Henricks is relegated to his filing date in Canada for his date of invention insofar as the Canadian patent is concerned." (Italics supplied.)

This is an admission that Henricks represented to the Canadian Patent Office, apparently for a self-serving purpose, that the disclosure made in his 1950 application in the United States "may have been added as 'new matter.'" The "new matter" referred to, as we understand, consisted of the disclosure made for the first time in Examples XIX and XX of Henricks' 1950 application, which enabled plaintiffs to obtain the "new and unexpected result" urged upon this Court.

Plaintiffs on brief, following the statement lastly quoted, further state:

> "The reference in the Canadian application to the 1950 United States application had no effect upon Henricks' United States patent applications."

[10] We think the accuracy of this statement is open to doubt. Assuming it to be correct, however, it misses the point. The fact that he made an admission to the Canadian Patent Office as to the date of his patent disclosure contrary to that which he previously made to this Court, in which he now persists, relates to his credibility and presents a matter for consideration by the trier of the facts.

We decide nothing more than that summary judgment was improvidently allowed. Anything we have said is not to be construed as a resolution of any factual issue. We have attempted only to point out some of the issues of material fact which, in our judgment, entitle the parties to a hearing.

The judgment appealed from is reversed and the cause remanded for that purpose.

DEVEX CORPORATION et al., Plaintiffs,
v.
GENERAL MOTORS CORPORATION,
Defendant,
Civ. A. No. 3058
United States District Court
D. Delaware
May 23, 1968.

MEMORANDUM OPINION

CALEB M. WRIGHT, Chief Judge.

The matter presently before the Court arises out of plaintiff Devex's motion to amend and supplement its complaint and defendant General Motors (GM) opposition thereto. The central issue underlying the current dispute is whether the doctrine of equivalents may, under the circumstances of this case, be invoked by plaintiff patentee under Claim 4 of its patent. Despite the rather strict limitations imposed upon Claim 4 by the Seventh Circuit Court of Appeals, see Devex Corporation v. General Motors Corporation, 321 F.2d 234 (7th Cir. 1963) and Devex Corporation v. Houdaille Industries, Inc., 382 F.2d 17 (7th Cir. 1967) and specifically adhered to by this Court in a prior opinion in the present case, Devex Corporation v. General Motors Corporation, 275 F.Supp. 310 (D.Del.1967), Devex nevertheless contends that it is not precluded from asserting the doctrine of equivalents against GM. As it reads those prior decisions, particularly the two from the Seventh Circuit, the doctrine of equivalents was nowhere discussed and is not ruled out by implication. They rely instead upon certain language of the Houdaille opinion to buttress their argument that the Seventh Circuit did not intend to foreclose them from properly invoking the doctrine of equivalents. GM, citing Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co., 196 F.2d 103 (7th Cir. 1952), counters that the main thrust of each of the above-cited opinions was to severely narrow the scope of Claim 4 in order to sustain its validity, with the result that Devex is not entitled to assert the doctrine of equivalents against it and thereby expand the scope of Claim 4 well beyond that upon which the decision upholding its validity was premised. Understandably, both Devex and GM have attempted to focus the Court's attention on those portions of the Houdaille opinion which can be construed most favorably towards their respective contentions. Devex, as noted previously, attaches particular significance to Judge Major's treatment of the equivalents issue. The problem before Judge Major, however, was whether the disclosure of "glycerol borate" in a prior patent was chemically identical to "soap and borax over phosphate" disclosed by the patent in suit in order to meet Houdaille's defense of "intervening rights." From Judge Major's conclusion that the disclosures of the two patents were identical, however, plaintiff infers that the doctrine of equivalents was not intended to be foreclosed to it and that it should apply, *a fortiori*, to an alleged infringer.

Defendant GM, on the other hand, points to other portions of the opinion which, they contend, show that the doctrine of equivalents was being applied very narrowly, limited to the defense of "intervening rights" and not extended to ensnare possible infringers. The language upon which GM relies appears at 382 F.2d pp. 22-23 of the Houdaille opinion as follows:

> "*** Thus, having obtained a decision of validity on a narrow and restricted basis, they (Devex) now contend, inconsistently we think, that the claim must be applied literally to defendant's alleged infringing process. Such a construction would mon-

> opolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results." (Parentheses added).

While the parties have pointed out apparently contradictory portions of the Houdaille opinion, they have overlooked a third observation made by Judge Major which clarifies the seeming ambiguity. This is found at the bottom right column of page 23:

> "In the instant case, as in General Motors, there is evidence that the patentee's process recognized by this Court required 'extreme temperatures and pressures of from 100,000 to 250,000 pounds Hertz stress.' There is also evidence that defendant's alleged infringing process requires pressures of only '10 to 25,000 pounds Hertz stress.'. Moreover, the tests relied upon were made in the drawing of wire rods. *Plaintiffs had the burden of proof upon a disputed issue as to whether the same result would have been obtained in the drawing of defendant's alleged infringing automobile bumpers.*" (Emphasis added).

Clearly, neither the narrow construction urged by GM nor the broader construction contended for by Devex was intended by the Seventh Circuit. It is the opinion of this Court that the Houdaille decision, with which this Court concurs, does not stop Devex from asserting the doctrine of equivalents with respect to Claim 4, but Devex may do so only with respect to those processes of GM which involve the same new coaction to produce the same "new and unexpected results" which are effected by soap and borax over phosphate as disclosed in the specifications of Examples XIX and XX of the Devex patent.

At the oral argument counsel for GM indicated that it was his understanding that one could not obtain the same coaction to achieve the new and unexpected results referred to above except through the use of soap and borax over phosphate. (Tr. 14 & 15). At this stage of the proceedings, however, the Court is uncertain as to whether that belief is well-founded.

Devex will, therefore, be allowed to amend its complaint to include any GM process which involves the same coaction to produce the same "new and unexpected results" as are produced by soap and borax over phosphate as disclosed by the specifications of Examples XIX and XX of the Devex patent. All discovery as to any such GM process will be subject to the limitations set forth by this Court in its opinion of November 8, 1967.

Submit order in accordance with the foregoing.

DEVEX CORPORATION et al.,
Plaintiffs,
v.
GENERAL MOTORS CORPORATION,
Defendant,
Civ. A. No. 3058.

United States District Court.
D. Delaware.
Sept. 8, 1970.

OPINION

CALEB M. WRIGHT, Chief Judge.

This is an action for infringement of Claim Four of Reissue Patent No. 24,017. It has been tried on the merits without a jury and the Court has heard posttrial argument.

DISCUSSION

Claim Four is now the creature of judicial construction. Its validity was saved by a narrow reading in the Court of Appeals for the Seventh Circuit, Devex v. General Motors, 321 F.2d 234 (7th Cir. 1963), applied here as the law of the case, Devex v. General Motors, 263 F. Supp. 17, 23-24 (D.Del.1967).[1] It is not the law, and the premise has not been seriously advanced, that proof of literal infringement would entitle plaintiffs to a judgment.

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[1] See also Devex v. Houdaille Industries, 382 F.2d 17, 22-23 (7th Cir. 1967).

In reversing the lower court decision that the process was unpatentable because obvious from the prior art, the Court of Appeals relied on evidence that "new and unexpected results flow from the conjunction of the elements defined in the drawing process * * *." 321 F.2d at 237. The new and unexpected results are not found in the language of the claim, but they are now its essence. Similar processes with different results do not infringe. This Court said in an earlier opinion, "If an allegedly infringing process falls within the literal language of the claim, but can be shown to operate in a different manner from the patented process, then there is no infringement." Devex v. General Motors, 263 F.Supp. 17, 25, 26 (D.Del.1967).[2] Plaintiffs were obliged, therefore, to show by a preponderance of the evidence, that the accused processes duplicated the critical results.

As in many patent cases, the Court found itself confronted with a mass of technical data and analysis. The evidence consisted largely of tests prepared by experts for each side in preparation for litigation. The test results and expert conclusions are conflicting, as might be expected, and, even to a layman, it appears that objectivity, the unremitting master of every laboratory, has not always been a fixed star in the inquiries conducted and presented to the Court. Although the errors, mostly of omission, seem to have occurred from diligence in the pursuit of proof rather than from bad faith or fraud, their presence has compounded the burden of one unskilled in the technology attempting to reach a correct result.

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[2] In Devex v. Houdaille Industries, 382 F.2d 17, 22-23 (7th Cir. 1967), plaintiffs contended that the claim should be applied literally to the accused process. The court said in response, "Such a construction would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results."

Because the issues are vigorously disputed by learned men of science, the outcome depending entirely on which tests, analyses, and explanations the Court adopts, it is well to recall, as did Judge Kirkpatrick, "that we are engaged in the determination of a dispute between two parties in a court of law, rather than in an excursion into the realm of scientific research, and we must approach the question from the standpoint of the rules which the law has established for resolving the controverted issue." Shimadzu v. Electric Storage Battery Co., 17 F.Supp. 42, 52 (E.D.Pa.1936). In making findings of fact, the Court is not conducting laboratory analyses, but applying a legal judgment to the evidence before it. It is making a determination that facts are proved or not proved, that the party who has the burden on a given issue has sustained it or not. A finding against the party with the burden, as the Court makes here, does not require absolute conviction that the opposing party has proved a contrary case. Any other approach would require judges to know more about the technology of a patent than the experts whose disagreement brings the dispute to court.

Plaintiffs were obliged to prove that a coaction occurs in the accused processes among the soap, borax, and phosphate at high temperatures and pressures, causing new compounds, including but not limited to glassy amorphous compounds, to be formed, and inhibiting the formation of water insoluble compounds. These results were demonstrated by plaintiffs' witness Henry Friedberg and relied on by the Court of Appeals to sustain the claim's validity. 321 F.2d at 234. This Court heard nineteen days of live testimony, which comprised most of the expert opinion relied on by the parties. It has reviewed the evidence and the exhibits offered to it and to the courts which considered validity, and it concludes that plaintiffs have not met their burden in establishing the essential results. The Court has no doubt that defendant's processes are effective, beneficial and an improvement over earlier solutions to their lubricating problems, nor that they utilize some of the learning upon which the patent is based. Use of that learning is not actionable, however, unless it produces the critical results.[3]

THE NEW COMPOUNDS

Plaintiffs' expert Henry Friedberg was again a key witness at the infringement trial. Plaintiffs relied almost solely on his tests and analyses to show that the new compounds are formed in the accused process. The Court was not comfortable, however, with Friedberg's reliance on his earlier experience with tests on the patented process to justify shortcuts in analysis of the accused ones. He failed to repeat his tests on the accused processes, to develop any standard charts, and to make any tests on the accused process without borax; he was quick to accept minimal evidence to identify the purported new compounds. His conviction was no substitute for the doubts implanted by probing crossexamination, and the Court was unpersuaded that the coaction occurred and new compounds formed even before defendant began its case.

The testimony of Dr. Martin Buerger concluded the issue. Dr. Buerger was a convincing witness, confident in his methods and his conclusions yet honest in their limitations. He found no evidence of the new compounds identified by Friedberg, and plaintiffs did little to shake the strength of his testimony. His conclusions were in accord with the findings of defendant's other expert, Dr. Cheever, and although Dr.

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[3] Varying the proportion of borax for the heavier draws with Bonderlube 246, for example, is taught by the prior art Whitbeck patent.

Cheever lacked the confident demeanor and commitment to objectivity displayed by Dr. Buerger, that they should agree on this point is significant, and it strengthens the finding that defendant's evidence was on the whole more convincing.

AMORPHOUS COMPOUNDS

Plaintiffs relied on the results of Friedberg's X-ray charts to establish the existence of the glassy amorphous compounds supposedly produced by the coaction. It is undisputed however, that in most cases such compounds are not discoverable, much less identifiable by X-ray analysis. Friedberg admitted that the basis for his conclusion, the flattening out of the tracings, could be due to the wiping action of the deformation process. The Court could not conclude that the amorphous compounds were present when the only evidence was a test not designed to disclose them.

WATER INSOLUBLE COMPOUNDS

The debate centered around zinc stearate, since it was that substance which was created by the prior art German process and the inhibition of which Henricks, the patentee, specifically claimed as an advance. On this issue again, there was no reason to disbelieve Friedberg's statement that he found no zinc stearate, but his failure to identify, or even to search extensively for, the peaks at the low angles was unsettling. When defendant's explanation that the low angle peaks actually represent a type of basic zinc stearate, admittedly not recorded in the ASTM files but chemically logical nevertheless, was presented, the Court found itself in a quandary.

Although Friedberg discovered upon reexamination that the mysterious peaks corresponded to those for barium stearate given in the ASTM files, plaintiffs did not present a chemical analysis of the substance either as produced by defendant or as found in residue after boiling a workpiece. The innuendoes that defendant had created a new substance and was being less then honest about its composition were not supported by proof, and the Court would not prefer them to evidence when no reason to doubt credibility or to suspect fraud appeared. Defendant had at least a standoff, and the plaintiffs, having the burden on the issue, must suffer the facts to be found against them.

Having found these three groups of facts, as well as others not discussed herein, against the plaintiffs, the Court must enter a judgment for defendant, and will do so upon submission of a proper order.

The foregoing and the findings of fact and conclusions of law which follow are made in compliance with Rule 52(a), Fed.R.Civ.P., 28 U.S.C.

FINDINGS OF FACT

1. The plaintiffs herein are as follows:

Devex corporation, an Ohio corporation located at Lakewood, Ohio;

Technograph, a North Carolina corporation having its principal place of business at 920 Northwest Boulevard, Winston-Salem, North Carolina;

William C. McCoy, now deceased, a citizen of the State of Ohio residing at 2712 Claythorne Road, Shaker Heights, Ohio;

Theodore A. TeGrotenhuis, a citizen of the State of Ohio residing at 7315 Columbia Road, Olmsted Falls, Ohio;

Frederick B. Ziesenheim, a citizen of the Commonwealth of Pennsylvania residing at 355 Woodside Road, Pittsburgh, Pennsylvania, and one of the attorneys of record for plaintiffs in this action;

Majorie E. TeGrotenhuis, a citizen of the State of Ohio residing at 7315 Columbia Road, Olmsted Falls, Ohio;

William C. McCoy, Jr., a citizen of the State of Ohio residing at Shaker Boulevard, R.D. #3, Chargrin Falls, Ohio;

Katherine M. Bassett, a citizen of the State of Connecticut residing at 27 Ox Ridge Lane, Darien, Connecticut.

2. Defendant General Motors Corporation, is a Delaware corporation residing in the District of Delaware.

3. The patent in suit is the outcome of an application, Serial No. 665,905, filed April 29, 1946, by the patentee Henricks. This application was abandoned in favor of a continuation-in-part application filed October 31, 1950, which issued as United States Patent No. 2,588,234, dated March 4, 1952. Application for reissue of Patent No. 2,588,234 was filed March 1, 1954 and on June 7, 1955, issued as Patent No. Reissue 24,017 now in suit. PTO 4—2.

4 Plaintiff Technograph holds all rights in and to Henricks Patent Re. 24,017 save for bare legal title which remains in the individual named plaintiffs. Plaintiff Devex has remained party to this action by virtue of certain reversionary rights. PTO 1,2.

5. Only Claim 4 of the Henricks Patent No. Re. 24,017 is charged to be infringed by defendant in this action. That claim is as follows:

The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

6. This patent infringement action was originally filed on November 13, 1956, in the United States District Court for the Northern District of Illinois under Civil Action No. 56-C-1912. A similar action was filed against Houdaille Industries in the same Court on May 22, 1957, under Civil Action No. 57-C-892. These Civil Actions Nos. 56-C-1912 and 57-C-892 were consolidated for trial on the issue of validity of Claim 4 of the Henricks Patent No. Re. 24,017. After trial, Judge Edwin A. Robson held Claim 4 of Henricks Patent No. Re. 24,017 invalid. On appeal, the Court of Appeals of the Seventh Circuit reversed and held Claim 4 valid, 321 F.2d 234. After remand, and on plaintiffs' motion, the case as to General Motors was transferred to the District of Delaware on July 16, 1965. The issues are raised in the Amended Complaint filed July 17, 1968 and in the Answer to the Amended Complaint filed August 19, 1968.

7. On January 16, 1967, this Court, by an opinion reported at 263 F.Supp. 17, denied plaintiffs' motion for summary judgment on the infringement issue.

8. Plaintiffs charge that the following metal forming processes of defendant infringed Claim 4 of the Henricks patent as held valid by the Court of Appeals of the Seventh Circuit. PTO 3-19.

A. *Pontiac Bumper Forming Process PTO 3-10*

(1) During 1955 and 1956 prior to commencement of this action, defendant at its Pontiac Motor Division plant formed automobile bumpers in progressive dies after Spra-Bonderite 111X had been applied to form a phosphate coating and

after Bonderlube 246 had been applied in a dilute solution to the phosphate coating and dried. PTO 3.

(2) Spra-Bonderite 111X was an acid zinc phosphate solution containing 12.0% Zn, 9.3% NO_3, 29.2% PO_4 and the balance water. The Bonderlube 246 in its dry state contained 15% borax and the balance sodium stearate-sodium palmitate soap. PTO 3.

(3) After flat steel blanks had been polished on one side to the finish desired on the bumper part prior to electroplating, and after the polished blanks had been spray cleaned in a Parco No. 341 cleaning solution and rinsed in hot water, Spra-Bonderite 111X phosphating solution was sprayed onto the blanks at a temperature of about 140° F to 150° F for 50 seconds. The phosphating step was then followed by cold and hot water spray rinses. PTO 4-5.

(4) The phosphate coated blanks were then rinsed in a hot solution of Parcolene 21 and water, and the excess solution thereafter removed from the surface with rubber squeegee rolls. Parcolene 21 in its dry state is 90% borax and 10% sodium nitrite and the Parcolene solution is made by mixing 2 pounds of Parcolene 21 with 100 gallons of water, Parker Specification No. 96, PX 60. PTO 5.

(5) A solution of Bonderlube 246 in water was then roller coated onto the phosphate coated blank at a temperature of approximately 190° F. The Bonderlube solution was prepared for coating and replenished during coating in accordance with the Parker Rust Proof Specification No. 113 PX 61, wherein 100 pounds of Bonderlube 246 were mixed with 100 gallons of water. PTO 5.

(6) The coated blanks were then passed through an infrared drying oven maintained at an interior air temperature of 425° F for a period of 20 seconds to remove the water and form a dry film on the blank. This completed the coating

operation in preparation for cold forming the bumper parts. PTO 5.

(7) The bumper parts comprised the front bumper lower impact bar (Part No. 521374), the front bumper bomb guards (Part Nos. 521424-5, Assembly Part Nos. 521794-5), the front bumper impact bars (Part Nos. 521338-9, Assembly Part Nos. 521771-2), and the rear bumper cross bar (Part No. 518851, Assembly Part No. 518963). The blanks which had been previously subjected to the above-stated lubricating steps, were then formed into the final bumper configuration and also cut, trimmed and pierced in a continuous operation by a series of dies in separate presses. PTO 5-8.

(8) The metal used for the flat steel blanks was a low carbon steel SAE 1008 and 1010 having a thickness of .110 to .097 inch. PTO 9.

(9) After being formed, the bumper parts were cleaned and prepared for electroplating as follows:

(a) The bumper parts were first passed through a three stage washer in which Wyandotte cleaner called Ferlon (an alkaline solution) was sprayed on at a temperature of approximately 180° F. PTO 9.

(b) After drying, the bumper parts were inspected and hand polished, when necessary, to remove spot defects and burrs. PTO 9.

(c) Then the bumper parts were put through a power washer in which they were sprayed with Wyandotte No. 38 alkaline cleaner at approximately 180° F for about 3 to 3½ minutes. PTO 9.

(d) The bumper parts were then rinsed in hot water for about one minute. PTO 9.

(e) The bumper parts were then immersed for approximately 4 minutes in a McDermid cleaner at a temperature of

180° F. The McDermid cleaner included sodium hydroxide, trisodium phosphate and sodium carbonate. PTO 9.

(f) The bumper parts were then rinsed in cold water for approximately ½ minute, placed in an acid dip of 10% sulphuric acid by volume for ½ minute, and then rinsed in cold water. PTO 9.

(g) After cleaning, the bumper parts were inspected for defects and, when necessary, spot polished by hand. PTO 10.

(10) The cleaning steps and cleaning materials and solutions used in cleaning the surfaces of the bumper parts after drawing and prior to electroplating, as above described in subparagraphs (a) to (f) of paragraph (9), were the same as those used in Pontiac's prior bumper forming process wherein a lubricant Mar-Proof, described as a "sticky oil" or a "sticky gunk," was applied prior to forming. The cleaning steps gave the same results in the BL 246 process as in the prior Mar-Proof process. PTO 10.

B. *Valve Lifter Plunger Process PTO 10-15*

(1) Defendant commercially cold formed in an extrusion operation hydraulic valve lifter plungers from ferrous metal slugs during 1955 and 1956 at its Diesel Equipment Division prior to commencement of this action. Prior to extrusion, Bonderite 181X was applied to form a phosphate coating on the slugs and then Bonderlube 235 was applied in a dilute solution to the phosphate coating and dried. PTO 10-11.

(2) Bonderite 181X was an acid zinc phosphate solution containing 13.6% Zn, 18.3% NO_3, 15.7% PO_4 and the balance water. The Bonderlube 235 in its dry state contained 3% borax, 2% sodium nitrite, and the balance sodium stearate soap. PTO 11.

(3) After the slugs, which were of SAE 1012 low carbon steel, had been washed, grit blasted and annealed to secure a

hardness of approximately RB 50 and a tensile strength of 35,000 to 50,000 p.s.i., and after they had been dipped in a pickling bath and rinsed in hot water, they were immersed for a period of 5 minutes in a Bonderite 181X phophating solution which was maintained at a temperature of approximately 185° to 190° F, thus forming on and integral with the surface a phosphate coating. PTO 11-12.

(4) The phosphate coated slugs, after a cold water rinse, were then immersed for one minute in a solution of Parcolene 21 and water at room temperature. PTO 12.

(5) The phosphate coated slugs were thereafter immersed for a period of approximately 5 to 7 minutes in a solution of Bonderlube 235 and water maintained at a temperature of approximately 165° F. The Bonderlube 235 solution was prepared for coating and replenished during coating in accordance with the Parker Rust Proof Specification No. 96, PX 60, wherein 56 pounds of Bonderlube 235 were mixed with 100 gallons of water. PTO 13.

(6) The slugs were then dried to remove the water and form a dry film on the slugs. PTO 13.

(7) The slugs which had been previously subjected to the above-stated lubricating steps, were fed (2 slugs at a time) into a Verson circular dial feed press. The press had 12 stations, PX 81. With each stroke, it simultaneously loaded two slugs, sized two slugs to a cylindrical shape having a length of approximately 0.640 of an inch and a diameter of approximately 0.625 of an inch, extruded two slugs, pierced two slugs, coined two slugs and unloaded two slugs. The press production rate was 30 strokes (60 plungers) per minute. Upon unloading, the extruded plungers were approximately 1.180 inches long and 0.635 of an inch in diameter. PTO 13-14.

(8) After the press operations, the plungers were then cleaned in a single stage Detrex Rotary Drum washer,

rotating on its horizontal axis, with advancing flights on the inner peripheral surface of the drum. As the formed plungers tumbled and advanced through the washer, Parco 532 cleaner (a mild acid type solution) was sprayed on them at a temperature of approximately 165° to 170° F, the spray solution forming a pool at the bottom of the washer. The parts were in contact with the cleaning solution for about 2 to 3 minutes. PTO 14.

(9) Prior to introduction of the above-designated procedures, the valve lifter plungers were machined from solid bar stock. PTO 14.

C. *Pontiac Rocket Forming Process PTO 15-19*

(1) Defendant cold formed in an extrusion process from metal billets rocket heads and rocket motor bodies for the United States Government at its Pontiac Motor Division plant during 1952 and 1953 after issuance of patent No. 2,588,234 on March 4, 1952. Prior to extrusion, Bonderite 180X was applied to form a phosphate coating and then Bonderlube 235 was applied in a dilute solution to the phosphate coating and dried. PTO 15.

(2) The steps generally followed in the production of the rocket head at Pontiac are recited in PX 87 and PX 88 and are pictorially shown in the photograph on page 1 of PX 91. PTO 15.

(3) After the metal billets had been cleaned, they were immersed for a period of approximately five minutes in a Bonderite 180X phosphating solution which was maintained at a temperature between 180° and 200° F, thus forming on and integral with the surface of the ferrous metal a phosphate coating. Bonderite 180X was an acid zinc phosphate solution and was prepared for coating in accordance with the Pontiac Process Specification, PX 88. PTO 15, 17-18.

(4) After a cold water spray rinse, the phosphate coated billets were sprayed with a solution of Parcolene No. 20 and water at a temperature between 160° and 180° F for ½ a minute. Parcolene No. 20 in its dry state is 66.6% borax and 33.4% sodium nitrite. The Parcolene No. 20 solution was prepared for coating in accordance with Pontiac Process Specification, PX 88. PTO 18.

(5) The phosphate coated billets were thereafter immersed for a period of 5 minutes in a solution of Bonderlube 235 and water maintained at a temperature between 180° and 200° F. The Bonderlube 235 solution was prepared for coating in accordance with the Pontiac Process Specification, PX 88. The billets were thereafter dried to remove the water and form a dry film on their surfaces. PTO 18-19.

(6) The process followed in defendant's production of rocket motor bodies is set forth to some extent in PX 89. It has been agreed by and between the parties that with regard to infringement, the findings of this Court with regard to the rocket head process shall be controlling and conclusive as to the rocket motor bodies. PTO 19.

9. Plaintiffs offered evidence to prove that the accused processes not only embodied the process steps set forth in Claim 4, but also achieved the same new and unexpected results upon which the Court of Appeals relied to sustain validity. Devex v. General Motors, 321 F.2d 234 (7th Cir. 1963). Plaintiffs attempted to show, inter alia, that,

(a) there was a new coaction among the soap, borax and zinc phosphate at high temperatures and pressures resulting in the formation of the new compounds referred to by the Court of Appeals, 321 F.2d at 237;

(b) there was a new coaction between the borax and phosphate under high temperatures and pressures resulting in the formation of glassy amorphous compounds, 321 F.2d at 237;

(c) the formation of water insoluble compounds was inhibited and there was no cleaning problem, 321 F.2d at 237;

(d) tool and die life was greatly increased, 321 F.2d at 237;

(e) the use of soap-borax over phosphate spelled the difference between success and failure, 321 F.2d at 237;

(f) there was ferrous metal phosphate in the coatings as required by the claim.

Plaintiffs contended that the claim did not require the inorganic compounds (borax and sodium nitrite) to melt and offered evidence to show that they were *meltable* at a temperature below that of the phosphate. Defendant asserted that melting is required and relied on some of the plaintiffs' evidence and some adduced from its own witnesses to show that the compounds did not and could not melt during its processes.

10. The plaintiffs have failed to prove by a preponderance of the evidence that new compounds are formed in the defendant's accused processes by a coaction among the soap, borax and the phosphate coating on the work pieces.

(a) The plaintiffs submitted in evidence diffractometer charts PX 71 to PX 74 inclusive made by its X-ray diffraction witness Henry Friedberg, to establish the formation of new compounds. Friedberg testified (a) he did not repeat his X-ray diffraction tests, Tr. 539-40, to determine whether the peaks he identified as including new compounds were actual diffraction peaks representing new compounds or random background irregularities; (b) he prepared no X-ray diffraction charts of the accused coatings without borax so as to determine whether the peaks relied upon in the charts PX 71-74 resulted from the presence of borax, Tr. 440-440A; (c) he made no standard charts of the new compounds he claims to have found so as to support his identifications, Tr. 578-79.

(b) At least three peaks of a diffraction pattern of a compound should be found for reliable identification of a compound. Tr. 498-99, 1173-75, 1459. Friedberg was unable to point to more than one or two peaks of any ASTM listing in the X-ray diffraction spectra on any one of the charts PX 71 through PX 74 as identifying new compounds allegedly formed in defendant's accused processes. Tr. 420-22, 425-27, 431-33, 434-36, 556-64; see testimony correction re PX 72 at 462.

(c) Friedberg selected 13 peaks in the spectra of the charts as identifying new compounds. A majority of these peaks occur at the same 2-theta angle locations as zinc phosphate peaks. Tr. 1450-58. Zinc phosphate consitutes a large portion of the coating of the accused processes, Tr. 1294, and a satisfactory identification of a new compound by a peak at the same 2-theta angle as zinc phosphates peak cannot be made. Tr. 505, 1450-57. Other of the peaks selected by Friedberg on charts PX 71, 72 and 74 as identifying new compounds appear to be of size and shape similar to the zig-zags of the spectra caused by background radiation. Tr. 1451-54, 1457-58; PX 69. A chart of Bonderlube 215 (no borax) over phosphate has peaks at the same 2-theta angles where boron compounds were identified by Friedberg in PX 71 and PX 72. Tr. 570-71, 573-74. The X-ray diffractometer charts PX 69 and PX 71 through 74 inclusive and the testimony of the witnesses do not establish that new compounds are formed in defendant's accused processes by a coaction between the borax and the phosphate coating.

(d) Dr. G.D. Cheever, a chemist employed by defendant, testified that the patterns of peaks of the X-ray diffractometer charts of the accused BL 235 and BL 246 coatings do not reproduce and do not match the patterns of peaks of the standard zinc borate and boron phosphate X-ray diffractometer charts and patterns of peaks of ASTM sodium boron phosphate and all other possible boron compounds. Tr. 1353-72, 1402-14, 1459-61. No new compounds are formed in the accused processes before or during the drawing operations by any coaction between the borax and the phosphate.

(e) Defendant's witness Abram Davis, is an expert in infrared analytical techniques. Tr. 2083-85. The infrared patterns of his charts of the accused BL 235 coating, the TD-1286-Q coating (no borax) and the German process coating are substantially the same. Tr. 2088. There is no evidence in the BL 235 infrared chart indicating that new compounds are formed by any coaction between the borax and the phosphate. Tr. 2088.

(f) Dr. Martin J. Buerger testified as an expert in analyzing defendant's powder photographs of the accused processes. He is Professor Emeritus at Massachusetts Institute of Technology and Professor at the University of Connecticut. He has been engaged in the study of crystal structures and the use of X-ray diffraction for 38 to 40 years Tr. 1107-1123A, 1125; DX 361.

An advantage of an X-ray powder photograph over an X-ray diffractometer strip chart is that the bursts of radiation are integrated uniformly over the entire film and do not interfere with the resolution and intensity of the lines resulting from beams diffracted by compounds. Tr. 1657-58, 1166-68, 1170-71. The powder photograph method using the Guinier camera is an accepted method and machine for analyzing materials by X-ray diffraction. DX 376A-C.

The photographs were taken of samples prepared, in accordance with established practice, by removing the coatings as a powder from the supporting surfaces and placing the powder particles in a holder through which the X-ray beams were directed. Tr. 1490-91, 1493-94; DX 250. The removal of a powder sample from its substrate is a standard way of preparing a sample for a powder photograph and such removal does not change the characteristic diffraction pattern as to the location of the lines. Tr. 1174-75, 1174; DX 250.

The patterns of lines of the powder photographs of the accused Bonderlube 235 and Bonderlube 246 coatings do not reproduce and do not match the patterns of lines of the standard zinc borate and boron phosphate powder photographs, or the patterns of lines of the gauge strips of other ASTM boron compounds and compounds identified by Friedberg as new compounds. Tr. 1679-94, 1717-22, 1729-35. Also, the pattern of lines of the powder photographs of the accused BL 235 and BL 246 coatings are substantially identical with the patterns of lines of the reference powder photographs of the BL 232 (soap without borax) and BL 248 (soap without borax). Tr. 1688, 1717-22, 1729. No new lines which would indicate the possible formation of new compounds due to the presence of borax appear in the BL 235 and BL 246 photographs as compared to the BL 232 and BL 248 reference photographs. Defendant's powder photographs of samples of the accused processes and of samples of soap without borax are persuasive that no new compounds are formed in the accused processes before or during the drawing operations by any coaction between the borax and the phosphate.

(g) The necessary conditions for starting and continuing reactions to form new boron compounds are not present in defendant's accused processes. Tr. 1480-83, 1645. Such reactions require high temperatures, above 600° C (1100° F), a reaction time of several hours at such high temperatures, and high concentrations in the solutions.

(1) In none of defendant's processes do the coatings become heated to temperatures in excess of 600° C (1100° F). Tr. 79, 1481.

(2) The heating of the coating in defendant's processes occurs in a second or a fraction thereof and not over the period of hours required for a reaction. Tr. 1481.

(3) Defendant's processes involve only dilute solutions of BL 235 and BL 246 which do not contain high concentrations of reacting ions which must move through a system and come in contact with other ions to form new compounds. Tr. 1481.

(h) There was testimony that zinc borate may be formed out of a cold concentrated borax solution by adding zinc sulphate or zinc chloride. Tr. 2590. However, defendant's solutions are dilute and do not contain zinc sulphate or zinc chloride. Tr. 2608; PTO 10, 18.

11. Plaintiffs have failed to establish by a preponderance of the evidence that glassy amorphous compounds are formed in the defendant's accused processes during the drawing operations.

(a) The evidence presented by plaintiffs analyzing samples of the coatings of the accused processes on the issue of whether glassy amorphous compounds are formed by any reaction of the borax and the phosphate coating were X-ray diffractometer charts PX 69 to PX 74, inclusive, and the testimony of plaintiffs' witness Friedberg with respect to those charts. Tr. 428, 523-531.

(b) Amorphous compounds are non-crystalline and are not detectable by X-ray diffraction methods, the only analytical method pursued by plaintiffs on the glassy amorphous compound issue. Tr. 523, 524, 528a, 529, 578.

(c) The reductions in the sizes of the peaks and the smoother appearances of the spectra in X-ray diffraction charts PX 72 (BL 246) and PX 74 (BL 235) of samples after the drawing operation as compared to charts PX 71 (BL 246) a PX 73 (BL 235) of samples before the drawing operation do not establish that glassy amorphous compounds are formed by a reaction of the borax with the phosphate coatings. Tr. 527-28, 531, 1461-62. The pattern in X-ray chart PX 70 (BL 215, soap without borax, over phosphate after forming) is also smoother with lower peaks than the pattern of PX 69 (BL 215 over phosphate before forming). Tr. 575-78. The reduction in size of the peaks on PX 72 and PX 74 is not shown to have been caused by any action differing from that which occurred as to PX 70 and which must have been an action unrelated to the presence of borax.

(d) Defendant's X-ray diffraction expert Dr. Cheever testified that reduction in the peak heights and the smoothing down of the spectra in X-ray diffraction charts PX 70, 72 and 74 of drawn samples occurs because during the drawing operation the coating is spread over more surface area as the metal stretches and flows and some of the coating is wiped off by the dies, thereby leaving less material at any one area to diffract the X-ray beam. Tr. 1461-62. Plaintiffs' witness Friedberg conceded that this wiping action was possible and that peaks can disappear due to other reasons than the formation of amorphous compounds. Tr. 527-28, 531. There is no record evidence demonstrating that the reduction in size of the peaks on PX 72 and PX 74 is due to the action of the borax, rather than this wiping action.

(e) Plaintiffs' witness Friedberg was unable to identify by name or formula any particular glassy amorphous compound in the samples of the charts PX 72 and PX 74 which he contended had been formed. Tr. 524, 528-29, 576-78. He did not distinguish the glassy amorphous compounds he contended were shown by charts PX 72 and PX 74 from those he stated were shown in PX 70 (no borax). Tr. 575-78. Nor did he distinguish the glassy amorphous compounds which he contended were shown by charts PX 72 and PX 74 from the glassy amorphous compounds which the prior art Orozco-Henricks patent 2,469,473 (DX 1) discloses are formed by the use of a soap-borax lubricant over metal without phosphate during the drawing operation.

12. The plaintiffs have not established by a preponderance of the evidence that the formation of water insoluble organic compounds is inhibited by borax in the defendant's accused processes.

(a) Plaintiffs' X-ray diffractometer chart PX 74 shows that the borax does not inhibit the formation of water insoluble compounds in defendant's BL 235 process. Friedberg failed to recognize the presence of basic zinc stearate in his X-ray chart PX 74 of defendant's BL 235 process which is shown by a number of new high peaks formed at 2-theta angles 5.5, 8.2 to 8.4 and 11. Tr. 565-69, 1349-50. The peaks at those angles agree with the water insoluble basic zinc stearate peaks at the same positions in defendant's standard basic zinc stearate X-ray chart DX 313-II and their relative intensities are the same. Tr. 1349-50. Dr. Cheever identified the new high peaks in PX 74 as basic zinc stearate peaks. Tr. 1349-50.

(b) Plaintiffs did not make the test of boiling in water any samples of the accused processes to determine whether or not water insoluble organic compounds formed any part of the coatings thereof. Tr. 348-49, 586-87.

(c) The infrared patterns run by Davis of Hooker Chemical Corporation on samples of BL 235, TD-1286-Q (no borax) and the German process, all over zinc phosphate, showed a characteristic at the 1600 reciprocal centimeters band which was not in the infrared pattern of USP zinc stearate. Tr. 1900. Hooker's Miss Hartinger, a qualified analytical chemist, after a review of the literature, produced in May 1965 a basic form of water insoluble zinc stearate whose infrared pattern included a strong infrared band at 1600 and matched the patterns of the coatings of the BL 235, TD-1286-Q and the German process. Tr. 1906-08.

(d) A sample of Miss Hartinger's May, 1965 batch of water insoluble basic zinc stearate was used by Dr. Cheever in making his standard X-ray diffractometer charts, DX 313-I, II and III, and DX 317. Tr. 1908-09, 1336-37, 1398, 1566-67. A sample of basic zinc stearate from a second batch produced by Miss Hartinger in June, 1965 which also gave the same strong 1600 infrared band, Tr. 1912-13, was used as the water insoluble basic zinc stearate standard in making powder photograph MSU 5a (DX 256a). Tr. 1600.

(e) The Buerger powder photographs disclose that the pattern of lines of the water insoluble basic zinc stearate standard photograph (DX 256a) are matched by the patterns of lines in the BL 235 photographs (DX 260a, 257a) and by the pattern of lines in the BL 246 photograph (DX 261a) as well as by the patterns of lines in the BL 232 and BL 248 photographs (DX 262a, 264a) with no borax. Tr. 1671-77, 1723-24. The line patterns of basic zinc stearate in the photographs of samples of the accused BL 235 and BL 246 processes are the same as the line patterns of basic zinc stearate in the BL 232 and BL 248 photographs without borax. Tr. 1674-75, 1724. This matching of lines in the powder photographs indicates that water insoluble basic zinc stearate is formed in the coatings of the accused processes and that the presence of 3% borax or 15% borax does not inhibit its formation.

(f) Cheever's X-ray diffractometer charts disclose that the pattern of peaks with the same peak intensities and locations of the standard X-ray diffractometer charts (DX 313-I, II and III) of water insoluble basic zinc stearate prepared by Miss Hartinger, is reproduced in each of the spectra 3 to 9, inclusive, on X-ray chart DX 327 of samples of coatings of the accused BL 246 process and the BL 248 process (no borax). Tr. 1340-43. The pattern of peaks with the same peak intensities and locations of the standard X-ray diffractometer chart (DX 317) of basic zinc stearate prepared by Miss Hartinger, is reproduced in each of the spectra 3 to 7, inclusive, on X-ray chart DX 320, of samples of coatings of the accused BL 235 process and the BL 232 process (no borax). Tr. 1394-1402. The matching of the basic zinc stearate patterns of peaks of the standard charts (DX 313, 317) with corresponding patterns of peaks in all spectra on charts DX 327 and DX 320 made from samples having BL 248 (soap only), BL 246 (soap-borax), BL 232 (soap only) and BL 235 (soap-borax) indicates that water insoluble basic zinc stearate is formed in the coatings of the accused processes and that the presence of 3% borax or 15% borax does not inhibit its formation.

(g) At the time of his early X-ray diffractometer charts of samples of the accused coatings, Dr. Cheever was unable to identify the basic zinc stearate peaks because that material was not recorded in the ASTM listings. Tr. 1316-1322. To determine whether a water insoluble compound was present in the coatings, he then boiled the accused samples in water and found that a whitish, waxy material was still present after boiling, which indicated that the whitish, waxy material was water insoluble. Tr. 1318. Chemical analysis of this boiled material determined that it contained zinc, carbon, hydrogen and oxygen, the elements of zinc stearate. Tr. 1320-21, 1517. X-ray diffraction charts (DX 318-I and II) show that the pattern of peaks of a boiled BL 235 sample closely matched the pattern of peaks of USP zinc stearate of the ASTM listing and no longer match those of an unboiled sample. Tr. 1319-20, 1323-27. Boiling of water insoluble basic zinc stearate in water converts it to water insoluble USP zinc stearate of the ASTM listing. Tr. 1319-20, 1323-27.

(h) Jones boiled in water both drawn and undrawn phosphated samples coated with the accused BL 235 and BL 246 lubricants and both drawn and undrawn phosphated samples coated with BL 248 (soap only) and the German material. He determined that a water insoluble organic compound remained on each of the samples after boiling. Tr. 1958-59, 1984-86, 1989-92, 1962-64. This water insoluble organic compound had been formed by a reaction between the zinc phosphate and the soap (DX 383). Neither Dr. Gibson nor Mr. Leland could remove by hot water the water insoluble organic compound formed by BL 235 over phosphate. Tr. 2199-2202; 847-48.

(i) McCullough of Hooker analyzed drawn and undrawn samples of the accused BL 235 process, TD-1286-Q (no borax) and the German process by the potentiometric titration method and determined that the coatings of each sample contained zinc stearate. Tr. 2107. Although he did not know the exact form of the zinc stearate, he had no doubt that the material he had found was a zinc stearate and that it was water insoluble. Tr. 2107.

(j) The uncontradicted testimony of record establishes that the Bonderlube 235 formula using 3% borax, 2% sodium nitrite and 95% reactive soap and applied over phosphate in an aqueous solution was developed by Parker for the specific purpose of generating in a period of a few minutes the same water insoluble zinc stearate formed by the German process over a period of 15 hours. Tr. 843-48, 2186-2204. The 3% borax served as a buffer and maintained the pH content at the desired level to enhance the reaction between the zinc phosphate and the reactive soap. Tr. 843-48, 2186-2204. The 2% sodium nitrite served as an anti-corrosive substance, Chicago Tr. 800-802, and there is no evidence that the sodium nitrite reacts or coacts with any other elements to form new compounds or perform the function of a meltable solid inorganic compound.

(k) The use of 15% borax in the accused BL 246 process is in accordance with the disclosures of the prior art Orozco-Henricks patent 2,469,473, DX 1, Col. 8, lines 5-19, and prior art Whitbeck patent 2,470,062, DX 3, wherein soap-borax lubricants are used over bare steel. The Whitbeck patent teaches that the borax to soap ratio may be varied from one metal forming process to another for a number of reasons, and that

(1) A higher soap content provides better lubrication at lower temperatures and a higher borax content provides better lubrication at higher pressures and higher temperatures, Col. 3, lines 11-15;

(2) The physical characteristics of the metal, the type of dies, die tolerance and clearance and surface finish and depth and complexity of the draw must be considered, Col. 3, lines 38-42;

(3) Deep draws and resultant high pressures and temperatures usually require a higher borax to soap ratio than lighter draws with lower temperatures and pressures, Col. 3, lines 45-48;

(4) The proper soap to borax ratio may be determined by a few trials with the particular dies and metal stock to be used, Col. 3, lines 62-66.

(l) The pattern of peaks in Curve 1 of the standard control chart DX 313-I, Curve 2 of DX 313-II and Curve 2 of DX 313-III, cannot establish the presence of barium stearate, as plaintiffs contend. Those standard charts were run on samples of Hooker or basic zinc stearate prepared by Miss Hartinger from known elements of which barium was not one. Tr. 1906-09. The same pattern of peaks occurs in the X-ray diffractometer charts of the accused coatings, DX 320, 322, 327 and PX 74, and barium is not present in those coatings. Chemical analysis of Miss Hartinger's basic zinc stearate also showed that barium is not present. Tr. 1320-21. In any event, the sample used by Dr. Cheever for the standard charts DX 313-I, II, and III, was water insoluble, as were the residues recovered from the coated work-pieces after boiling in water. Tr. 1319-20.

13. Plaintiffs have not shown by a preponderance of the evidence that the accused processes left defendants with no cleaning problem. In none of the processes was it possible to remove by hot or boiling water the water insoluble organic soap film left in the coating after the draw.

(a) Alkaline cleaners were unable to remove the residue of the BL 235 in the plunger process, and a mild acid type solution (Parco 532) was necessary. Tr. 790.

(b) Hot water would not remove the residue of the BL 235 rocket process. A strong alkaline cleaner containing 20% caustic was necessary. PX 99, pp. 44-45.

(c) The BL 246 bumper process required the same multistep chemical cleaning process as the previous process using a sticky oil. PTO 10. Defendants used Wyandotte, Ferlon, McDermid and sulphuric acid cleaners, PTO 10, the same cleaners used before, and there is no indication of improvement with BL 246.

The cleanability tests performed by Dr. Rabinowicz and Friedberg would have been more persuasive if they had been able to more closely approximate operating conditions and if they had used parts deformed under heat and pressure with the lubricant thereon. Tr. 95-104, 334, 449-50, 450-57. In any event, they did not demonstrate that the films were removable without a "cleaning problem."

14. The plaintiffs have failed to prove by a preponderance of evidence that the die life was greatly increased, as discussed by the Court of Appeals of the 7th Circuit (321 F.2d at 237).

(a) As to the accused BL 246 Pontiac bumper forming process, the dies lasted the entire 1956 model run but so did the previous dies where the Marproof (sticky oil) lubricant was used. Tr. 715; PX 103, p. 39. The 1956 dies of the accused process still had to be stoned periodically to eliminate die loading and pickup so as to prevent galling and scratching of the parts, and hand polishing to eliminate scratches and scoring also was still necessary, although to a lesser degree. Tr. 694-95, 715. It was still necessary to apply tallow or grease over the dried film to aid in lubrication of areas where deep draws occurred. Tr. 708.

(b) There is no evidence that die life was increased by the accused BL 235 plunger process. The plunger formerly was machined out of solid bar stock, which did not involve dies. Tr. 760-61.

(c) The accused BL 235 process did not greatly increase tool and die life in the extrusion of the rocket at Pontiac. Until the time the rocket contract was cancelled by the U.S. Government, the dies and punches continued to break. The BL 235 process did not prevent that breakage. Tr. 730, 750; PX 97, pp. 24-25. The rocket dies had a shorter life than the life of Pontiac's regular automobile production dies, although BL 235 was used over phosphate. Tr. 750-51.

(d) In his tests plaintiffs' witness Lenz formed only 24 or 25 pieces using BL 215 (no borax) over phosphate, only 24 or 25 pieces using BL 235 over phosphate and only 24 or 25 pieces using BL 246 over phosphate. Tr. 308-09, 311. The effect of different lubricants on die life can only be determined by extended periods of use wherein many thousands of pieces are used and examined. Plaintiffs' Court of Appeals Brief, page 9. Lenz stated that one BL 215 piece had a burr, one BL 235 piece had no burr and one BL 246 piece had no burr. Tr. 291-92. He did not examine the other BL 215, BL 235 and BL 246 pieces. Tr. 311. In the accused BL 246 process as used in production, burrs were formed and had to be removed in a separate operation. PTO 9.

CONCLUSIONS OF LAW

Upon the foregoing findings of fact, the Court concludes as a matter of law as follows:

1. The Court has jurisdiction of the parties and the subject matter of the issues raised by the pleadings of the parties herein.

2. Plaintiffs have the burden of proving patent infringement by a preponderance of the evidence.

3. The construction of a claim when its validity is contested controls the construction of that same claim when its infringement is alleged. The patentee cannot urge a restrictive interpretation of his claim to avoid invalidity and then an expansive interpretation to ensnare infringers. *Devex v. General Motors*, 263 F.Supp. 17, 25 (D.Del.1967); *Devex v. Houdaille*, 382 F.2d 17, 23 (7th Cir., 1967).

4. Plaintiffs have not shown by a preponderance of the evidence that the accused processes achieve the same "new and unexpected results" which formed the basis of the holding of validity of Claim 4 of the Henricks patent in suit by the Court of Appeals for the Seventh Circuit.

5. There is no preponderance of the evidence in favor of plaintiffs that in the accused processes (a) there is a new coaction between the soap, borax and phosphate, (b) new compounds or glassy amorphous compounds are formed, (c) the formation of water insoluble organic compounds is inhibited, (d) tool and die life is greatly increased, and (e) there is no cleaning problem, or that any of these results is achieved. The credible evidence is to the contrary and preponderates in favor of defendant.

6. Defendant's bumper forming process practiced at its Pontiac Motor Division plant during 1955 and 1956 using Bonderlube 246 over a zinc phosphate coating formed from

Spra-Bonderite 111X was not an infringement of Claim 4 of Henricks Patent No. Re. 24,017.

7. Defendant's extrusion process practiced at its Diesel Equipment Division plant in 1955 and 1956 in the forming of valve lifter plungers using Bonderlube 235 over a zinc phosphate coating formed from Bonderite 181X was not an infringement of Claim 4 of Henricks Patent No. Re. 24,017.

8. Defendant's rocket forming process practiced at its Pontiac Motor Division plant during 1952 and 1953 in the forming of rocket heads and rocket motor bodies for the United States Government using Bonderlube 235 over a zinc phosphate coating formed from Bonderite 180X was not an infringement of Claim 4 of Henricks Patent No. Re. 24,017.

9. Defendant is entitled to entry of a judgment dismissing the Amended Complaint herein and awarding defendant its taxable costs on the infringement issue.

MEMORANDUM OPINION OF JUDGE WRIGHT

December 16, 1970

WRIGHT, Chief Judge.

On September 8, 1970 this Court, after nineteen days of trial on the sole issue of infringement, rendered an opinion and entered Findings of Fact and Conclusions of Law.

On October 1, 1970, the plaintiffs Devex et al., filed a motion to amend the Court's Findings of Fact and to make Additional Findings.

The motion requested the Court to modify the second paragraph on page 9 of the Pre-trial Order and to amend Finding of Fact 8 A (8) by deleting "having a tensile strength of from 30,000 to 32,000 p.s.i." Subsequently by letter to the Court dated October 15, 1970 the defendant agreed "to the modification of the second paragraph on page 9 of the Pretrial Order and the amendment of Finding of Fact 8 A (8). Although the Findings of Facts reported in 316 F.Supp. 1376 were printed with Finding of Fact 8 A (8) modified as agreed upon, the opinion as filed as a part of the official record in the case did not delete that portion of 8 A (8) as requested and agreed upon. A form of order amending claim 8 A (8) by deleting "having a [3] tensile strength of from 30,000 to 32,000 p.s.i." may be submitted by the plaintiffs. The Court will sign the order so that this aspect of the record will be complete.

The second prong of the plaintiffs' motion asks the Court to make additional Findings of Fact as follows:

> "(1) The combination of soap-borax over phosphate as the lubricant in the patented process is adequately disclosed in Henricks' original 1946 patent application and the patented process, including this embodiment, is entitled to the April 29, 1946 filing date as the date of invention (PB 83-99).
>
> (2) The petition for priority in Henricks' corresponding Canadian patent application is not an admission against interest as to a later invention date for the soap-borax over phosphate embodiment of the patented process as defendant alleges but rather was an unintentional clerical error (PB 100-102).
>
> (3) Henricks' reported testimony in the Houdaille deposition, pertaining to an alleged admission that soap-borax over phosphate is not disclosed in his original 1946 patent application was a reporting error and is not an admission against interest of an invention date for this embodiment of the patented process subsequent to the filing date of the original 1946 patent application (PB 102-104). [4]

> (4) The soap-borax over phosphate practice at Standard Steel Spring is not prior art to the patented process, including the soap-borax over phosphate embodiment, because it commenced subsequent to the 1946 filing date of Henricks' original patent application (PB 104-105)."

The plaintiffs concede that the requested findings are not essential to the decision the Court has made. They base their request upon the fact that they were put to considerable expense and effort in rebutting an affirmative defense alleging that the plaintiffs were not entitled to a record date of invention of April 29, 1946, because the invention as published was not disclosed in the specifications filed in the original application; and further, that this was confirmed by Henricks in a statement on deposition, by his representation in the Canadian patent application and by the fact that prior to 1950 the invention was practiced by Standard Steel Spring.

They urge upon this Court that making the additional findings as requested will lay at rest the filing date to which the plaintiffs are entitled and the defense of Standard Steel Spring's practiced cold forming process as prior art. By so [5] doing, they reason, future judicial efforts would be conserved as well as the efforts of the parties.

After studying the file wrapper and those parts of the record essential to a proper determination of the issues raised by the requested additional findings, the Court is convinced that no judicial time would be saved nor would the efforts of counsel be conserved.

As the defendant points out in its brief, the Court based its opinion on the failure of the plaintiffs to show by a preponderance of the evidence that the accused processes duplicated the critical results achieved by the plaintiffs' invention. If the Court is correct in this conclusion, the date of invention is irrelevant. If, on the other hand, the date of invention ever becomes a decisive issue, careful consideration of all the facts will be required, and several critical points of law must be decided. The resolution of the issues raised by the requested additional findings of fact will be more difficult because so much has been written concerning this patent already.

[6] The Court has concluded that the interest of justice will be better served by deciding this issue only when and if it becomes essential to the ultimate termination of the litigation.

This aspect of the plaintiffs' motion for Additional Findings of Fact is therefore denied.

Submit order.

In the United States District Court
For The District of Delaware
FINAL JUDGMENT
Entered Januray 13, 1971;

This cause having been submitted to the Court for trial without a jury on the issue of patent infringement, and the Court having considered the pleadings, the decision of the Court of Appeals for the Seventh Circuit in *Devex, et al. v. General Motors, et al.*, 321 F.2d 234, 236-7 (1963), holding Claim 4 of Henricks patent No. Re. 24,017 valid, the stipulations of the parties, the Pretrial Order entered herein, the evidence received at the trial, and the briefs and arguments of counsel of the respective parties following trial, and the Court having rendered an Opinion and entered Findings of Fact and Conclusions of Law on September 8, 1970,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. That defendant has not infringed Claim 4 of said Henricks patent No. Re. 24,017 by its 1955-1956 Pontiac bumper forming process using Bonderlube 246 (soap-15% borax) over a Bonderite IIIX phosphate coating, by its 1955-1956 valve lifter plunger forming process using Bonderlube 235 (soap-3% borax) over a Bonderite 181X phosphate coating, or by its 1952-1953 rocket forming process using Bonderlube 235 (soap-3% borax) over a Bonderite 180X phosphate coating.

[2] 2. That the Amended Complaint is dismissed with prejudice.

3. That defendant recover its taxable costs on the infringement issues in this action.

4. That the interlocutory order of February 3, 1967 of this Court decreeing that the decision of the Court of Appeals for the Seventh Circuit holding Henricks patent No. Re. 24,017 good and valid in law is binding on defendant and the law of the case, is hereby made final and a part of the Final Judgment.

/s/ Caleb M. Wright

United States District Judge

January 13, 1971

Approved as to form:

/s/ David F. Anderson

Attorney for Plaintiffs

/s/ Thomas S. Lodge

Attorney for Defendant

* * *

UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

Nos. 71-1344, 71-1345

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. Te GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE Te GROTENHUIS, WILLIAM C. McCOY, JR., and KATHERINE M. BASSETT,
Appellants in No. 71-1344

v.

GENERAL MOTORS CORPORATION,
Appellant in No. 71-1345

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

Argued June 9, 1972

Before HASTIE, GIBBONS and M. ROSENN,
Circuit Judges

OPINION OF THE COURT

(Filed September 26, 1972)

HASTIE, *Circuit Judge.*

In the decision from which this appeal has been taken the District Court for the District of Delaware held, after full hearing on the merits, that a lubricating process used by General Motors Corporation, hereinafter "GM," to facilitate the fashioning of metal into automobile bumpers and other manufactures did not infringe claim 4 of Reissue Patent No. 24,017, owned by Devex Corporation and hereinafter designed as the Henricks patent.[1]

Cold forming operations, with which this patent is concerned, involve pressing a workpiece, the metal to be deformed, against or between a die or dies so that it takes on a desired form. To accomplish "deep" or difficult draws of ferrous metal great pressure must be applied, and heat is generated by the relative movement under that pressure between the surface of the die and the surface of the workpiece. One of the problems of the art is the lubricating of these surfaces in such a way that galling and scratching the workpiece and defacing and otherwise damaging the die are avoided or minimized. It also is important that any substance that adheres to the workpiece after drawing be readily and inexpensively removable.

Claim 4 of the Henricks patent discloses a method of lubricating the workpiece by "forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating. . . ."

Specifications that were part of the Henricks patent application gave examples of the claimed process, including formulas for compositions of soap and borax that would serve as the film to be superimposed on the initial phosphate coating of the workpiece.

Devex originally filed the present suit against GM and a companion suit against Houdaille Industries, Inc., another alleged infringer, in the District Court for the Northern District of Illinois. The two cases were consolidated for the limited purpose of adjudicating the common issue of the validity of Henricks claim 4. The court then proceeded to hold the patent invalid. On appeal, the Court of Appeals for the Seventh Circuit found claim 4 valid, though in a narrower context than its comprehensive language suggested, and remanded the cases for consideration of the issues of infringement. *Devex Corp. v. General Corp.*, 7th Cir. 1963, 321 F.2d 234.

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[1] Reissue Patent No. 24017 has now expired. Thus, while a court can award damages for infringement that occurred during the life of the patent, injunctive relief is no longer appropriate.

At this point the courses of the suits against GM and Houdaille diverged. The suit against GM was removed to and decided by the District Court for the District of Delaware, and now is before us. The Houdaille case remained in the Northern District of Illinois where, on motion for summary judgment, the court decided that the defendant had infringed claim 4. On appeal that judgment was vacated and the cause remanded for full hearing on the merits. *Devex Corp. v. Houdaille Industries, Inc.*, 7th Cir. 1967, 382 F.2d 17. We are told that the claim against Houdaille was then settled.

The first Seventh Circuit appeal, contested by Devex and GM in this very suit, held, and the subsequent Houdaille appeal confirmed, that on its face claim 4 was merely a combination of old elements that were part of the prior art. However, the Court of Appeals considered and found valid the contention of Devex that, although its process was a combination of old and familiar elements, by superimposing a film of soap and borax over a phosphate coating as its above cited specifications taught, it had achieved unexpected and surprisingly favorable results that were different from what persons skilled in the art would have anticipated from this combination upon the basis of their knowledge and experience.[2]

More particularly, in the prior art phosphate coatings had proved harmfully abrasive when subjected to great pressure in drawing. And though adding a soapy film might be expected to lessen abrasiveness, in practice such a supplement had caused the deposit of a stubborn insoluble residue that was difficult to remove from the workpiece. These circumstances considered, the court found that, as claimed by the inventor,[3] the Henricks combination of a soap and borax film over a phosphate coating solved both of these problems by interacting under the pressure and resultant heat of drawing to form substances that minimized abrasion during the drawing and at the same time inhibiting the adherence of a stubborn water insoluble film to the workpiece.

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[2] It is familiar learning that in the combining of old and familiar elements the achievement of an unexpected result is needed and may suffice to make the combination patentable. *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Co.*,

GM contends that is followed the essential teaching of a familiar prior art "German process" rather than the Henricks process. The German process taught a presoaking of a phosphate coated workpiece for as long as fifteen hours in a soap solution until chemical reaction of the constituents formed a water insoluable soapy film. Henricks, the inventor who obtained the patent in suit and now is president of Devex, admitted in this case that a workpiece lubricated by the German process "drew beautifully." But it is conceded that the firm adherence of a residual water insoluble film to the workpiece after draw-

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Note 2—*Continued*

1950, 340 U.S. 147; *Griscom-Russell Co. v. Westinghouse Electric & Mfg. Co.*, 3d Cir. 1941, 121 F.2d 680.

The Court of Appeals for the Seventh Circuit stated the issue it considered and resolved in this case as follows:

> "Plaintiffs concede all of the elements which Henricks employed in claim 4 of the patent in suit were old per se or in other combinations and have been available in the art for some years. However, plaintiffs contend that the elements which Henricks selected were put together in a new way and achieved a new and unexpected result." *Devex Corp. v. General Motors Corp. supra*, 321 F.2d at 236.

[3] In Example XIX, the Henricks patent application specifies a "Bumper Bar Forming Lubricant" that can be "readily cleaned off so that no defective nickel platir _ will be caused by any lubricant residues."

ing made the metal very difficult to clean. Indeed, Henricks testified that in some uses of the German process, "you can't remove it [the film] at all unless you burn it off in an annealing oven. . . ." In any event, "a serious defect in . . . [the German process] was that the residual deposit was not water soluble and presented a difficult cleaning problem especially if the workpiece was to be electroplated,"[4] as were the bumpers formed under lubrication by the accused GM process.

In sum, early phosphate coatings, even spongy phosphates that were soaked in wet lubricants before drawing, were unsatisfactory because of their abrasiveness. The German process minimized abrasion and galling and thus facilitated difficult drawing, but at the same time it created a serious problem of cleaning after drawing. Henricks disclosed a combination of soap and borax superimposed on phosphate that also provided satisfactory lubricity, indeed superior lubricity for drawing under extreme pressure and heat, without making the drawn metal difficult to clean. Because Henricks was able to achieve and maximize the familiar advantages of the elements he combined and at the same time to eliminate disadvantages that had hampered their earlier use, the Court of Appelas for the Seventh Circuit concluded that he had achieved an unexpected result that made his combination inventive and patentable.

The practice of GM in lubricating its metal for drawing into the shape desired for its manufactures certainly reads on Henricks. Admittedly, the phosphate coating differs in no significant way from Henricks. And the superimposed soap-borax film is precisely what Henricks taught. In his specifications Henricks suggested soap and borax in the proportions of as much as four or five parts of borax to one of soap. Testifying in this case he explained that borax in quantities varying according to the pressure required in particular drawing, served both to improve lubricity and to emulsify the residue which otherwise would adhere to the workpiece as a hard to remove coating.[5] The district court found in this case, pursuant to the agreement of the parties incorporated in a pretrial order, that in forming bumpers GM used only fifteen percent borax with eighty-five percent soap. However, bumper forming is not an extremely high pressure drawing such as Henricks taught would require a lubricant with very high borax content.

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[4] *Devex Corp. v. General Motors Corp., supra*, 321 F.2d at 236.

Henricks did not teach and GM did not allow the waiting period of many hours between lubricating and drawing which characterized the German process and, according to the evidence, may have contributed significantly, the more so in the absence of borax, to the formation of an insoluble residue and its stubborn adherence to the workpiece.

It may well be that in developing his process Henricks was concerned primarily with devising a method of lubrication that would be effective in and could be adapted to drawings that were more difficult than the GM drawings involved in this case. But at most this means that the Henricks process could be adjusted to work satisfactorily over a wide range of drawing conditions. It does not warrant an inference that GM used some other process.

Despite the above described close correspondence of GM lubricating practice with the teaching of the Henricks patent, the district court concluded that infringement was not proved because Devex failed to establish that GM achieved the unexpected results that made the Henricks combination patentable. In our view the record does not warrant that factual conclusion.

The practical measure of lubricity is the effectiveness of the lubricating process in minimizing galling of the surface workpiece and damage to the die during drawing. The record indicates that satisfactory lubricity, thus measured, was achieved both by the Henricks process and in the GM practice. Moreover, the German process, which GM purported to have used, was notably efficient in this regard, although tests indicated that the presence of borax, common to Henricks and GM but not taught by the German process, yielded even better lubricity at temperatures above 190°C.[6] And the depositions of GM technicians who observed or participated in the GM drawing also indicate that drawing was accomplished without serious galling or defacement of workpieces or dies. Accordingly, the district court properly found "that defendant's processes are effective, beneficial and an improvement over earlier solutions to their lubricating problems." 316 F.Supp. at 1378.

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[5] The Court of Appeals for the Seventh Circuit held that Henricks claim 4 was not made invalid for vagueness by the fact that it failed on its face to specify the proportions of soap and borax to be used. *Devex Corp. v. General Motors Corp., supra*, 321 F.2d at 238.

It follows that if, as GM claims, its practice did not achieve the essential and characterizing results that made the Henricks disclosure patentable, its shortcoming must have been a failure to achieve easy cleanability in conjunction with the satisfactory lubricity that it did achieve.

The most important single item we find in this long record on the issue of cleanability appears, with the express approval of the opposing parties, as an admitted fact in the district court's detailed Pre-Trial Order. That order states categorically that GM experienced "no cleaning problem with either the accused process or with the lubricant "Mar-Proof," described merely as a "sticky oil," which GM used without an underlying phosphate coating before adopting the accused practice. However, the district court found that the accused practice created a "cleaning problem" because its use had to be followed by the same cleaning procedures that were used with Mar-Proof. But it is clear that, whatever the lubricant used, the workpiece requires cleaning after drawing. And when, as in the case of auto bumpers, the article is to be electroplated the surface must be most thoroughly cleaned. Since GM contends that it was using the German process, the relevant comparison here is between that process, which admittedly created a difficult cleaning problem, and the GM process which, consistent with Henricks, made possible a simple and easy cleaning of the drawn workpiece. Tests introduced into this record showed significantly easier cleaning of workpieces coated in the GM manner with a lubricant that contained borax than of workpieces coated with the German process lubricant that contained no borax.

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[6] Friction between surfaces that slide while pressed together is the damaging circumstances that a lubricant must minimize by separating the adjacent surfaces. Temperature and pressure tend to cause lubricants to break down. Accordingly, the relative effectiveness of lubricants in a given environment of application is expressed by comparing their coefficients of friction in that environment. Tests introduced into this record showed that the presence of borax in lubricants for metal deforming operations was beneficial in environments hotter than 170°C. And from 190° upward borax in increasing amounts was essential to an adequate lowering of the coefficient of friction. The GM drawings created temperatures in excess of 190°. The tests showed that both the Henricks process and the GM practice, both of which used borax, lubricated even more effectively than the German process at temperatures in excess of 190°.

Accordingly, neither the components of the GM lubricant, the manner in which that lubricant was used, nor the lubricity and cleanability achieved by the accused practice show any significant departure from the method of lubricating taught by Henricks or the results achieved by that method.

GM has attempted to avoid this conclusion by introducing expert testimony that the chemical interactions that occurred during drawing under the pressure and heat of the accused practice were different from those reported by Henricks in particular applications of his process. However, in evaluating this line of proof it must be kept in mind that Henricks claimed a method of lubricating a metal workpiece that yielded in drawing an unexpectedly favorable conjunction of lubricity and cleanability. He did not claim any patentable discovery of a chemical reaction or compound. Indeed, it was not essential to the patentability of the Henricks combination that he describe or even understand any chemical reactions that made it work better than other lubricating methods.[7] In brief, a showing that like or different chemical reactions occur in the course of drawings utilizing allegedly different lubricating methods may suggest inferentially that the results yielded by the methods are or are not equivalent. But if it is directly determinable that the two lubricants have essentially the same components, are applied in the same way and that the results of their use are essentially the same, the disputation of chemists about the chemical interactions that occurred in the processes cannot be decisive.

Moreover, it may well be that chemical reactions differed in degree, and perhaps in kind as well, in different applications of the Henricks process. Claim 4, even as restricted and held valid in the Seventh Circuit, covers and protects the combination of soap and borax in proportions to be varied according to the nature and difficulty of the draw to be facilitated so that the process will yield its claimed advantages over a wide range of drawing pressures and temperatures. It is not claimed that in every Henricks mix under every temperature, chemical reaction and its products will be identical. Thus, if one accepts as persuasive the testimony of GM experts that reactions and substances produced during the GM drawings were not identical with those that the Henricks process is said to have produced using different proportions of ingredients under different pressures at different temperatures, it does not follow that GM practice failed to produce the results that made the Henricks process patentable.

In these circumstances, the demonstrated effectiveness of GM practice in producing the satisfactory drawing and ease of cleaning that Henricks had achieved must prevail over any contrary inference drawn from disputed expert testimony as to comparative chemistry in what may well not have been equivalent situations.

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[7] *Diamond Rubber Co. v. Consolidated Tire Co.* (1911), 220 U.S. 428; *Crozier-Straub, Inc. v. Graham*, 3d Cir. 1928, 28 F.2d 321.

By its cross appeal GM challenges that part of the judgment of the district court which held that the decision of the Court of Appeals for the Seventh Circuit, sustaining the Henricks patent as valid in a stated limited context, was binding upon GM. The legal basis of this challenge is a contention that venue was lacking in the Northern District of Illinois where suit was instituted. The court below held that GM had waived its objection to venue. For the reasons fully and clearly stated in the district court's opinion, *Devex Corp. v. General Motors Corp.*, D.Del. 1967, 263 F.Supp. 17, we sustain that holding.

The judgment will be reversed.

UNITED STATES COURT OF APPEALS

FOR THE THIRD CIRCUIT

Nos. 71-1344 and 71-1345

Devex Corporation, Technograph, Inc., William C. McCoy, Theodore A. TeGrotenhuis, Frederick B. Ziesenheim, Marjorie TeGrotenhuis, William C. McCoy, Jr., and Katherine M. Bassett,

Appellants in No. 71-1344

vs.

General Motors Corporation,

Appellant in No. 71-1345

(D.C. Civil Action No. 3058)
ON APPEAL FROM THE
UNITED STATES DISTRICT COURT FOR THE
. . . DISTRICT OF DELAWARE

Present: Hastie, Gibbons and Rosenn, Circuit Judges

JUDGMENT

This cause came on to be heard on the record from the United States District Court for the . . . District of Delaware and was argued by counsel.

On consideraton whereof, it is now here ordered and adjudged by this Court that the judgment of the said District Court, filed January 13, 1971, be, and the same is hereby reversed as to that portion of the said judgment which held that the defendant had not infringed Claim 4 of Reissue Patent No. 24,017, which holding is the subject of the principal appeal herein at our No. 71-1344; as to that portion of the said judgment which held that the decision of the Court of Appeals for the Seventh Circuit, sustaining the Henricks patent as valid in a stated limited context, was binding upon GM, it is further ordered that said portion of said judgment be and hereby is affirmed, all in accordance with the opinion of this Court. Costs taxed in favor of appellants in No. 71-1344 and in favor of appellee in No. 71-1345.

ATTEST:

THOMAS F. QUINN
Clerk

September 26, 1972

UNITED STATES COURT OF APPEALS

FOR THE THIRD CIRCUIT

Nos. 71-1344 and 71-1345

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. MCCOY, THEODORE A. TEGROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TE GROTENHUIS, WILLIAM C. MCCOY, JR., AND KATHERINE M. BASSETT,

vs.

GENERAL MOTORS CORPORATION,

Appellant.

SUR PETITION FOR REHEARING

Present: Seitz, *Chief Judge;* and Hastie, Aldisert,
Gibbons *and* M. Rosenn, *Circuit Judges.*

The petition for rehearing filed by GENERAL MOTORS CORPORATION, *Appellant,* in the above entitled case having been submitted to the judges who participated in the decision of this court and to all other available circuit judges of the circuit in regular active service, and no judge who concurred in the decision having asked for rehearing, and a majority of the circuit judges of the circuit in regular active service not having voted for rehearing by the court in banc, the petition for rehearing is denied.

By the Court,

COLLINS J. SEITZ
Chief Judge

Dated: November 29, 1972

SUPREME COURT OF THE UNITED STATES
OFFICE OF THE CLERK
WASHINGTON, D.C. 20543

May 7, 1973

J. Pierre Kolisch, Esq.
Kolisch, Hartwell & Dickinson
1004 Standard Plaza
Portland, Ore. 97204

RE: Salem Eqpt., Inc., et al. v. Kockum Industries, Inc., 72-951; O.M. Scott & Sons Co. v. Noll and Fortunato, Trustees, 72-1127; *General Motors Corp. v. Devex Corporation, et al., 72-1161.*

Dear Sir:

The Court today entered the following order in the above-entitled cases:

72-951 — The petition for a writ of certiorari is denied.
72-1127 — The petition for a writ of certiorari is denied.
1161 — The petition for a writ of certiorari is denied. Mr. Justice Powell took no part in the consideration or decision of this petition.

cc: John D. Nies, Esq.
George N. Hibben, Esq.
Richard W. Seed, Esq.
Stanley L. Amberg, Esq.
Walter J. Blenko, Esq.

Very truly yours,

MICHAEL RODAK, JR., Clerk
By

/s/ Helen Taylor, (Mrs.)
Assistant Clerk

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, ET AL. *Plaintiffs,* v. GENERAL MOTORS CORPORATION *Defendant.*	Civil Action No. 3058

REPORT OF SPECIAL MASTER PURSUANT TO F.R.C.P. 53(e)

February 7, 1980

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I. PROCEDURAL BACKGROUND

A. History of the Case

In late 1956 and in 1957, plaintiffs filed lawsuits against General Motors Corporation and Houdaille Industries, Inc., respectively, in the United States District Court for the Northern District of Illinois, claiming in both actions that defendants had infringed Claim 4 of the Henricks Reissue Patent No. 24,017. The patent had been reissued on June 7, 1955, on Original Patent No. 2,588,234 dated March 4, 1952, as the result of an application filed October 31, 1950. The patent expired on March 4, 1969 (Princ. Doc.,* Tab 1, p. 1; Plaintiffs' Br. on Acctg., p. 1; Defendant's Br., p. I-16; APTO,** App. I, p. 2).

The Houdaille and General Motors actions were thereafter consolidated (382 F.2d at 19). Following trial, by opinion dated February 1, 1962, implemented by a final judgment entered June 29, 1962, Claim 4 was held by the District Court (through District Judge Edwin A. Robson) to be invalid and void (Princ. Doc., Tab 2).

From the finding of invalidity, plaintiffs appealed. The Court of Appeals reversed, *Devex Corporation, et al. v. General Motors Corporation, et al.*, 321 F.2d 234 (7th Cir. 1963), *cert. den.*, 375 U.S. 971 (1964), adjudicating the validity of Claim 4 of the Henricks patent.

After remand plaintiffs' action against General Motors was transferred to the District of Delaware. *Devex Corporation v. General Motors Corporation,* 146 U.S.P.Q. 346 (N.D. Ill. 1965). Houdaille Industries remained as a defendant in the

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* The reference is to a booklet entitled "Principal Documents on Accounting" put together by defendant, and filed with plaintiffs' concurrence.

** "APTO" refers to the Pretrial Order on Accounting.

Chicago case (263 F.Supp. at 20). After discovery both sides in the Houdaille case moved for summary judgment on the issue of infringement. Plaintiffs prevailed. *Devex Corporation, et al. v. Houdaille Industries, Inc.*, 148 U.S.P.Q. 74 (1965). The Court of Appeals again reversed, *Devex Corporation v. Houdaille Industries, Inc.*, 382 F.2d 17 (7th Cir. 1967), concluding that summary judgment was inappropriate. Later the Devex-Houdaille controversies were resolved by settlement (467 F.2d at 258).

Meantime, the Devex action against General Motors was transferred to the District of Delaware and assigned to then Chief (now Senior) Judge Caleb M. Wright. Plaintiffs moved for summary judgment. In opposition to the motion General Motors advanced a finely spun venue theory toward the proposition that it was not bound by the validity holding of the Seventh Circuit in the Houdaille case. Rejecting this argument, the Court held that the Seventh Circuit's holding of the validity of Claim 4 of the Henricks Reissue patent bound General Motors. But, on the infringement question, the Court (differing from the shortly-thereafter-reversed approach of the Chicago District Court) held summary judgment to be inappropriate. *Devex Corporation, et al. v. General Motors Corporation*, 263 F.Supp. 17 (D. Del. 1967).

Validity having been resolved, and infringement not being susceptible of summary disposition, a trial on the infringement issue was held before Judge Wright. The result was a determination that defendant had not infringed the Henricks patent.* *Devex Corporation v. General Motors Corporation*,

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* Pre-trial skirmishes gave birth to two additional reported decisions: *Devex Corporation, et al. v. General Motors Corporation*, 275 F.Supp. 310 (D. Del. 1967), sustaining defendant's objections to plaintiffs' overbroad interrogatories, and *Devex Corporatoin, et al. v. General Motors Corporation*, 285 F. Supp. 109 (D. Del. 1968), granting plaintiffs' motion to amend their complaint so as to assert the doctrine of equivalents.

316 F.Supp. 1376 (D. Del. 1970). Plaintiffs appealed. And the Court of Appeals reversed, concluding that the District Court had erred as a matter of law in failing to find that defendant had infringed the patent in suit. *Devex Corporation, et al. v. General Motors Corporation*, 467 F.2d 257 (3d Cir. 1972), *cert. den.*, 411 U.S. 973 (1973).

On remand, on March 15, 1974 Judge Wright appointed the undersigned as special master to resolve the issues remaining between the parties in the accounting phase of the litigation. Discovery proceeded, and included dozens of depositions, hundreds of interrogatories and answers, and thousands of pages of document production. Where controversies developed between the parties, they were resolved by the special master.*

The trial began October 30, 1978, and concluded February 14, 1979. It consumed fifty-three trial days, and generated hundreds of exhibits. The last brief, filed in accordance with a schedule settled between the parties, was submitted August 15, 1979. Oral argument was held November 14, 1979.

And, seminally, this is the special master's Report.**

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* In the years since the order of reference, none of the special master's decisions have been appealed. Hence, the Court will be looking at all aspects of the accounting phase of the case with a fresh eye when it reviews this Report.

** If there is a sigh in this sentence, it stems from the reminder of mortality which the long duration of this controversy has produced. On February 4, 1977, George Hibbens, Esquire, one of defendant's counsel, passed away. Walter Blenko, Esquire, a principal advocate for plaintiffs, expired in November, 1978. Although both sides continued to be represented by counsel of the highest quality, the loss of these singularly able, and gentlemanly lawyers, caused sadness to all involved in the case.

B. Design of the Decision

The character of the controversies here is such that to restrict the exposition of the decision-making process to numbered paragraphs would be to leave it choppy and disjointed. I have, therefore, elected to frame the decision in narrative form, *cf. Ass'n of Westinghouse Employees v. Westinghouse Corp.*, 283 F.2d 93 (3d Cir. 1960), hoping that this style will make for a smoother, and therefore, more understandable flow.

Style to one side, my aim has been to produce a decision which is understandable, subject to meaningful review, and therefore likely to advance the final denouement of this twenty-odd year old judicial drama. Toward that purpose a strong effort has been made to fairly come to grips with the major contentions advanced by each side. The record is heavy. The parties' post-trial presentations by themselves consist of perhaps a thousand pages of briefs, proposed findings, comments, and computations. While I have not explicitly dealt with each of the very large number of contentions made by the parties, most have been treated with in the decision and none has been ignored in the deliberations leading to it.

II. INFRINGEMENT

A. Law of the Case

1. It is the Law of the Case that Each of the Three Prior Trial Practices Infringe

Plaintiffs accuse sixty-one separate practices which were employed at various of General Motors, divisions as infringing the patent in suit. Three of these practices were *sub judice* before Judge Wright, and later before the Court of Appeals for the Third Circuit in the earlier infringement cases. What the Third Circuit decided provides controlling guidance on the infringement question here. Not atypically the parties are at odds on the Third Circuit's adjudication.

The background of the "law of the case" controversy may be described in this way. Claim 4 of the Henricks patent teaches a process for the lubrication of metals before cold forming, and covers:

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising of solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal." (Princ. Doc., Tab 1, p. 18.)

The "organic binding material" contemplated by the patent is soap. The "inorganic compound" is borax, or some other inorganic substance meeting the patent's claims and performing the same function as does the borax.

In holding the patent invalid, Judge Robson adverted to the indefiniteness of Claim 4 in that it did not specify " . . . the amounts and proportions of the compounds . . ." (Princ. Doc., Tab 2, p. 260). One of the lubricants before Judge Robson was Bonderlube ("BL") 235, a material produced by a company then known as Parker Rustproof Company. BL 235 is described by Judge Robson as containing about three per cent borax (*Id.*, p. 221).

The Seventh Circuit, in reversing Judge Robson and validating the patent, held the absence of quantitative borax-content measures not to be fatal. *Devex Corporation v. General Motors Corporation,* 321 F.2d 234 (7th Cir. 1963). It reached this conclusion although the BL 235 lubricant had a much smaller borax content (three per cent) than was suggested by Example XIX (at least fifty-eight per cent borax and boric acid), and Example XX (eighty-five per cent borax) found at column 15 of the patent (Princ. Doc., Tab 1, p. 15).

When the General Motors case was transferred from Illinois to Delaware for trial on the infringement issue, three accused practices or processes were presented to Judge Wright (APTO, App. I, p. 26). The first was used by Pontiac for the formation of bumpers, and involved the use of phosphate over Parker's BL 246, a lubricant with a fifteen per cent borax content. The other two processes entailed the use of BL 235 (described as containing three per cent borax as Judge Robson had earlier noted, along with two per cent sodium nitrite and ninety-five per cent soap), and were employed in the making of valve lifter plungers at defendant's Diesel Equipment Division and the making of rocket parts at Pontiac (316 F.Supp. at 1380-1383). Judge Wright held that none of the three processess infringed (316 F.Supp. at 1390). The Court of Appeals reversed (467 F.2d 257).

In its opinion the Third Circuit devoted specific attention to the accused Pontiac BL 246 process. Defendant urges that the reversal was restricted to that process, and that Judge Wright's non-infrigement findings as to the two BL 235 practices were either left undisturbed, or that it was the intent of the Third Circuit to keep the slate clean for fresh consideration on remand as to the BL 235 practices. Plaintiffs argue that all three practices were before the District Court, and came before the Court of Appeals by their appeal of the judgment below.

Thus is the issue joined. While only one of many issues between the parties, it is the first because its disposition will provide controlling guidance as to whether the many other BL 235 (and like-BL 235) processes accused here infringe.

I conclude that plaintiffs are correct, and that the Court of Appeals did adjudicate the infringement of the prior trial BL 235 processes. Most simply put, the Third Circuit had before it a judgment which contained a finding of non-infringement as to all three processes, and held "The judgment will be reversed" (467 F.2d at 262). What was regarded by the trial court to be non-infringing was therefore held by the Third Circuit to be infringing.

Nothing in the Third Circuit's decision implies that the Court wished to regard the BL 235 processes separately or differently from BL 246 which undisputedly was found to be infringing. For example, no distinctions between the two lubricants are drawn by the decision, such as would support the view that as to one the Court intended to reverse and as to the other it did not. Further, while mainly discussing BL 246, the Opinion in its very first sentence refers to the District Court's holding as involving a process used by General Motors to facilitate ". . . the fashioning of metal into automobile bumpers *and other manufacturers.*" (Emphasis added. 467 F.2d at 257-258.) The only "other manufactures" before the Court of Appeals were the two BL 235 processes.

While the discussion could stop at this point, the importance of the issue and the argumentative energy which defendant has devoted to it have impelled a closer look at the appellate papers to assure that they are consistent with what appears to be clear adjudicating language in the Court of Appeals Opinion. They are.

In its brief on appeal to the Third Circuit, defendant repeatedly made reference to the BL 235 process. See *e.g.*, General Motors brief at pages 11, 28, 31, and 34. Indeed, a reading of defendant's brief inspires a sense of deja' vu, since defendant advanced in the Court of Appeals the same contentions which it repeats now toward the point that its BL 235 processes did not infringe.

Following the Third Circuit's decisions, defendant filed a petition for rehearing. One cannot read that petition without acquiring the conviction that defendant itself *knew* the decision applied to both the BL 246 and BL 235 processes. Both are explicitly referred to in the petition (see, *e.g.*, Pet. For Reh., pp. 4, 5, 6). And, tellingly, defendant, for reasons best known to it, did not urge the Court to change, or as defendant would suggest "clarify", its decision to make it apply only to the BL 246 process. To the contrary, cleaning tests on BL 235 samples were described, and defendant only urged the Court to give the tests of defendant's witnesses "greater consideration" (*Id.*, p. 5). The Court was invited to recognize (as am I) that the "no cleaning problem" provision in the pretrial order cited in the opinion as "[t]he most important single item" (467 F.2d at 261) related to the Bl 246 process and not the Bl 235 process (Pet. for Reh., p. 6). The Court of Appeals declined to in any way adjust its decision in response to defendant's imprecations.

In its petition for certiorari to the United States Supreme Court defendant made no distinction between the BL 246 process which it concedes the Third Circuit intended to hold as infringing, and the BL 235 processes which it now says were left open by the Court of Appeals' decision. Again the petition dealt with all three processes. After describing the District Court's findings with respect to the BL 235 and BL 246 accused practices (Pet. for cert., p. 8, particularly fn. 23), defendant characterized the holding of the Court of Appeals thusly:

> "In effect, the Third Circuit ruled that where a process patent is given limited validity by a holding based solely on coaction not described in the claim, and to which the claim is not limited, the patentee may nevertheless enforce its patent monopoly against other processes within the claim's unspecific language, even where such coaction has not been shown to occur." *Id.*, p. 10.

The "other processes", as to which the Third Circuit is suggested to have erroneously ruled, appear from the context of the petition for certiorari to be the accused BL 235 processes as well as the BL 246 process. Nowhere in its petition did defendant suggest that the only process passed on by the Court of Appeals, and therefore subject to review by the Supreme Court, was the BL 246 process.

Finally defendant did not apply for a special form of mandate separating out the BL 235 uses from the BL 246 practice, as was its right (FRAP 36, 41). The mandate as actually entered " . . . reversed as to that portion of the said [District Court] judgment which held that the defendant had not infringed Claim 4 of the Reissue Patent No. 24,017, which holding is the subject of the principal appeal herein . . ."

That defendant should not have moved for a special form of mandate is consistent with what seems to me to be its clear recognition that the Court of Appeals intended to hold all three processes before it as infringing. The mandate as entered puts the final nail in the coffin of defendant's law-of-the-case argument.

But, argues defendant, there are nevertheless differences between the characteristics of BL 235 and BL 246 which can be taken into account now to hold the latter non-infringing even though the Court of Appeals may have concluded otherwise. I do not find that the cases on which defendant relies support that conclusion.

Imperial Chemical Industries v. National Distillers and Chemical Corp., 354 F.2d 459 (2d Cir. 1965), is cited by defendant as "especially in point" toward the proposition that there remains latitude to argue that the BL 235 prior trial practice did not and does not infringe. In *ICI,* a trade secret case, the trial court originally denied plaintiff a preliminary injunction, and the Court of Appeals reversed and remanded.

See 342 F.2d 737 (2d Cir. 1965). On remand interlocutory relief was again refused, this time because the trial court corrected a finding which it had made prior to the first appeal. Again plaintiff appealed. This time the Second Circuit declined to reverse, and in so doing, it emphasized two factors which are not present here. First, in *ICI* the trial court itself found it had been in error and corrected the error. In the case at bar the Court of Appeals found the trial court in error, and by its mandate of reversal the Court of Appeals corrected the lower court's error. What defendant seeks in this case is for me to in effect find the Third Circuit in error and reinstate Judge Wright's findings. Neither *ICI* nor any other authority permits that result. Second, in *ICI* the trial court's findings were themselves only tentative because " . . . the findings of fact made upon the motion for preliminary injunction are not controlling . . ." (354 F.2d at 463). See also, 1B *Moore's Federal Practice*, ¶ 404[10], p. 572. Here, in contrast, the prior trial accused practices were *sub judice* before the Third Circuit on appeal from definitive *post-trial* findings upon which a final judgment on the infringement issue rested. The Court of Appeals' judgment, as to which certiorari was sought and denied, was final with respect to all findings and conclusions which were before the Court.

Defendant also relies upon *Aro Manufacturing Co., Inc. v. Convertible Top Replacement Co., Inc.*, 377 U.S. 476 (1964), which affirmed in part and reversed in part a decision at 312 F.2d 52 (1st Cir. 1952). An earlier installment of the *Aro* litigation ("*Aro* I") (365 U.S. 336 (1961), *reh. den.*, 365 U.S. 890 (1961)) had resulted in a holding that replacement fabric auto convertible tops sold for use on vehicles manufactured by General Motors, a licensee under the patent in suit, were permissible "repair". The Supreme Court concluded that by purchasing and furnishing the replacement fabric, GM customers and the manufacturer, respectively, were not direct or contributory infringers. In a subsequent *Aro* case

("*Aro* II"), the District Court interpreted the earlier Supreme Court decision to mean that replacement fabrics for vehicles produced by an unlicensed manufacturer (Ford) were similarly immune from claim by the patentee. The Court of Appeals concluded that the Supreme Court had intended its exculpatory decision to apply only to vehicles which were manufactured under license (312 F.2d 52). On certiorari the Supreme Court agreed (377 U.S. 476). Both *Aro* II opinions carefully review the logic and language of the *Aro* I decision, leaving no doubt that the Supreme Court had intended to limit that decision. Here, by contrast, logic and analysis compel the conclusion that the Third Circuit did not intend to limit its decision, but rather intended its reversal to apply to all three alleged infringements which had been placed before it for review.

Defendant also adverts to *Standard Oil Company of California v. United States,* 429 U.S. 17 (1976). That case held that the district court had the power to open a judgment under F.R.C.P. 60(b) without seeking leave of the appellate court which affirmed it. Neither the holding, nor the brief discussion which supports it, have the slightest connection with the law-of-the-case issue here.

The other cases cited, but not much discussed by defendant are similarly unpersuasive.

The governing law-of-the-case principle is (quoting from *Re Sanford Ford & Tool Co.,* 160 U.S. 247, 255) as announced in *In re Potts,* 166 U.S. 263, 266 (1897):

> "When a case has been once decided by this court on appeal, and remanded to the circuit court, whatever was before this court, and disposed of by its decree, is considered as finally settled. The circuit court is bound by the decree as the law of the case; and must carry it into execution according to

> the mandate. That court cannot vary it, or examine it, for any other purpose than execution; or give any other or further relief; or review it, even for apparent error, upon any matter decided on appeal; or intermeddle with it further than to settle so much as has been remanded. . . ."

The task on remand is to play the ball as it lies. There can be no rolling over to give one side or the other a better shot. Here that means acceptance by me as master of the no-longer-disputable premise that the prior trial accused processes using BL 235 as well as BL 246 are infringing. It follows as a matter of law that any other accused practices which operate in substantially the same way as those prior trial practices, and which produce substantially the same results must also be found to infringe. *Flat Slab Patents Co. v. Turner*, 285 F. 257, 273 (8th Cir. 1922). See, dealing with the analogously applicable doctrine of equivalents, *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 608 (1950).

2. It is the Law of the Case that Cleanability in a Routine, Commercially Acceptable Way Satisfies the "Cleanability" Requirement of the Patent

The decisions touching the patent require that the user achieve "easy cleanability". For the reasons which follow, I find that this requirement is satisfied by any accused process which permits cleaning to be done in a routine, commercially acceptable way.

In its second review of the Henricks patent in the *Houdaille* case, *Devex Corporation v. Houdaille Industries, Inc.*, 382 F.2d 17 (7th Cir. 1967), the Seventh Circuit made it plain that plaintiffs could not prove infringement based solely upon a literal reading of Claim 4 of the patent. They had to prove, in addition, that by following the Henricks' teaching a "new and unexpected result" ensued (383 F.2d at 23). But for this requirement, the Court strongly implied, the patent would not have survived attack since " . . . such a [literal] construction would monopolize the whole broad field of metal forming with any use of dry soap and borax over phosphate at any temperature or pressure, regardless of results." (*Ibid.*)

Following the decision of the Seventh Circuit, Judge Wright found that the BL 235 and BL 246 processes literally tracked the teachings of Claim 4, but held that they did not infringe because they did not achieve the new and unexpected results promised by the patent as construed. In reversing, the Third Circuit swept aside arguments as to *how* the results were achieved, and held that it was sufficient for plaintiff to prove that the accused process achieved "easy cleanability" in conjunction with "satisfactory lubricity" (467 F.2d at 261).*

The Third Circuit in its decision further illuminated the cleanability requirement by referring to a "no cleaning problem" stipulation as meeting the requirement in BL 246 Pontiac bumper practice. The stipulation was a part of the pretrial order in the infringement case (APTO, App. I, p. 10). Defendant has sought to limit it, believing that without the stipulation it would have been exonerated of infringement.

But I think the "no cleaning problem" stipulation gave away nothing. For what the stipulation meant, and what it was taken to mean, is that metal coated in the way taught by the patent could be cleaned in a routine, commercially acceptable way.

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* *Eutectic Corp. v. Metco, Inc.*, 579 F.2d 1 (2d Cir. 1978), involved patents for a flame spray device designed to cause a self-bonding coat to be affixed to metal surfaces. Citing the Third Circuit's *Devex* decision, the Court held it of no legal consequence that the reactions giving rise to the desired results were even different from those the patentee had reported.

The record of the prior trial made it crystal clear that Pontiac bumpers required multi-step post-forming preparation prior to electroplating. See, *e.g.*, the cleaning procedures described in Judge Wright's decision (316 F.Supp. at 1381). The Court of Appeals was not ignorant of this. The clear purport of the Court of Appeals' ruling is that the need for cleaning did not vitiate the application of the patent. To the contrary, it vitalized the patent so long as the cleaning could be done in the regular course of production.

This conclusion is consistent with (what I have found to be) the Third Circuit's holding that BL 235 processes also infringed. The prior trial valve lift plungers were cleaned after forming in a drum washer with a mild acid spray for 2-3 minutes (316 F.Supp. at 1382) and the rocket parts were cleaned in a strong alkaline cleaner (316 F.Supp. at 1389). Again it was enough that cleaning could be accomplished in a commercially routine way.

While finding it to be the law of the case that it is enough to prove commercial cleanability (as in the prior trial bumper use of BL 246 and non-bumper lubrication with BL 235) the cleanability point should not be left without giving recognition to an argument which the defendant has strongly, and not unpersuasively, urged. Defendant's argument can be stated thusly: In sustaining the validity of the patent, the Seventh Circuit found it advantageous, cleanability-wise, by comparing the patent with the so-called "German process" which involved a coating of soap-only over borax over the workpiece accompanied by a long soaking period. It found that the German process had a "serious defect in . . . that the residual deposit was not water soluble and presented a difficult cleaning problem especially if the workpiece was to be electroplated" (321 F.2d at 236). The Seventh Circuit relied upon plaintiffs' argument that the "difficult cleaning problem" was ameliorated because the patented process formed "amorphous glassy materials" and with the further result that "the formation of insoluble organic materials is inhibited and there is no cleaning problem" (*Id.* at 236-237). The Seventh Circuit emphasized this unexpected result in its opinion in the second *Devex* case (382 F.2d at 22-23).

Defendant urges that in fact the selfsame water insoluble substance produced by the German process is produced by the accused BL 235-type processes. It submits that its items of manufacture, particularly those produced by processes like the prior trial BL 235 processes, are neither less nor more difficult to clean than was the case under the German process. It urges that plaintiffs have failed to prove that the accused borax-containing lubricants create more cleaning difficulties than would have been the case were the borax omitted. Defendant concludes, therefore, that these processes cannot be held to infringe.

This is not a frivolous argument. It was evidently persuasive to Judge Wright, whose decision finding non-infringement cited evidence showing that zinc stearate (the difficult-to-clean substance deposited by the German process) also appeared when defendant practiced the accused patented processes. *E.g.*, Findings 12(a), (c), (d), (e), (f), (g), (h), (i), (j), (l), and 13 (316 F.Supp. at 1386-1389). And the argument was again ably made to the Third Circuit in defendant's effort to secure an affirmance of the District Court's non-infringement findings. Indeed, an examination of its brief on appeal and its motion for reargument makes it plain that the bulk of defendant's presentation on review was devoted to the proposition that plaintiffs had not shown that the patented process resulted in a cold-formed piece easier to clean that would have resulted under the pre-patent German process.

Were I writing on a clean slate I might (or might not) reach the same conclusion as did Judge Wright. But I am not. The Third Circuit has adjudicated (as I have found) that the prior trial BL 246 and BL 235 processes infringe. By so finding, it can only have intended to compare the success of the routine ("simple and easy") commercial cleaning steps used in the prior GM trial practices with the "difficult cleaning problem" postulated as the principal vice of the German process. It is that comparison which the Court found was "[t]he relevant comparison" (467 F.2d at 261).

To go at it a different way, defendant argued long and hard to the Third Circuit that Judge Wright was correct in holding that the prior trial practices (the BL 235 *and* BL 246 processes) produced the same water insoluble zinc stearate formed in the German process. (*E.g.*, Defendant's Brief to the Third Circuit, pp. 30-32). The Court of Appeals found it unneccessary to assay the chemical correctness of defendant's contention. Rather it emphasized that the accused practices accomplished the needed cleaning job with no problem, which I take to mean in a routine, commercial way. If it is assumed that the German process could not be cleaned except with extraordinary effort, the logic of this approach is self-evident.

But logical or not, the zinc stearate battle fought before Judge Wright and in the Third Circuit is now over. The special master's marching orders are to find as infringing those practices which (in addition to the other patent requirements) have the same routine, commercial cleanability characteristics as the prior trial practices. And that is the approach which will be followed.

3. It is the Law of the Case that Lubricity Sufficient to Achieve Effective Production Satisfies the "Satisfactory Lubricity" Requirement of the Patent

In addition to routine, commercial cleanability, the decisions touching the patent require that the user achieve "satisfactory lubricity" (*e.g.*, 467 F.2d at 261).

At the trial of this cause the parties devoted a very large amount of energy toward laboratory proofs of the effect of borax and other inorganic substances on lubricity. Plaintiffs offered as an expert Professor Ernest Rabinowicz, of the Massachusetts Institute of Technology, toward the point that in pin-on-metal tests the addition of borax and equivalents tended to reduce the coefficient of friction of the steel to which it was applied. Defendant supplied Professor Kenneth Ludema, of the University of Michigan, whose laboratory tests, using a somewhat different pin-on metal device, generated results diverging by a large degree from those reached by Dr. Rabinowicz.

Predictably, each side probes the tests of the other in an effort to expose the errors which led to what it sees as mistaken conclusions. Plaintiffs assail the alleged inexperience of defendant's personnel in preparing test samples, Dr. Ludema's supposed failure to have checked his results for internal consistency or drift, the manner in which the cantilever was attached to the Ludema machine, the manner in which Ludema accounted for the stick-slip phenomenon, and out-of-control results statistically arguable as to some of Dr. Ludema's tests. For its part, defendant attacks the Rabinowicz friction machine, the top limit of 252° C. reached by plaintiffs' tests, the many allegedly subjective adjustments Dr. Rabinowicz felt himself obliged to make to his test results, the supposed lack of repeatability of the Rabinowicz results, the fact that the Rabinowicz tests were made with foreknowledge of what was being tested rather than in the blind, etc.

While the record does permit a decision on the question of which set of lubricants was more slippery in the pin-on-metal tests, in the context of the controversies here that is an unnecessary exercise.* For if arguments among chemists were thought by the Court of Appeals to be unimportant in the cleanability context (467 F.2d at 261), they are of even less use in resolving the issue of whether the accused practices achieve satisfactory lubricity.

Judge Wright found from the record as a whole in the prior infringement trial that " . . . defendant's processes are effective, beneficial and an improvement over earlier solutions to their lubricating problems . . ." (316 F.Supp. at 1378). The Court of Appeals observed that the record supported ("properly found") this conclusion (467 F.2d at 260).

The central inquiry here is not which expert in the antiseptic environment of a laboratory would be most likely to accurately predict whether a particular lubricant will or will not achieve satisfactory lubricity. Lubrication tests in a laboratory are at best an imperfect barometer of what production experience is likely to show. It is how the lubricant works in the production process that is the true test.* I find that borax-containing lubricants would not have been used in actual production if defendant did not believe they worked satisfactorily.

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* In other phases of the case findings are made although not strictly necessary to the conclusion reached so as to try to make a record which will avoid the need for remand if there is found to be error in any particular. In the matter of the lubricity tests I should say that I am not in doubt as to which of the two experts, by reason of experience and the reasoning underlying his views, I would trust were I to embark on a commercial venture in which laboratory information as to the slipperiness of metal variously coated. But although a choice could be made between the experts as to which set of tests to credit, it is clear that each was sincere and forthcoming, and believed in the reliability of his experiments. Under such circumstances it seems to me a gratuitously hurtful exercise to resolve what I have concluded to be an immaterial controversy.

Respecting this conclusion, defendant's references to instances in which borax-containing lubricants did *not* work are of interest:

> "Pontiac tried Pennsalt Drawcote 1044 on its production equipment. Tr 5018 (Herrmann); Def. Ex. A-28-2. This lubricant contained 74 percent borax and 25 percent sodium tallow soap. Def. Ex. A-25, Pennsalt tab, p. 3. The work so lubricated was broken in the test, and Pontiac did not use such lubricant in production. Def. Proposed Finding Tr D-5.
>
> "A decade later, Pontiac had trouble with Great Lakes Steel lubricated by Production Finishing with

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* At oral argument, defendant's counsel stated: "As I read the Court of Appeals decision at least, it seems to me that the Court is saying that if you use it and don't have troubles, that is satisfactory lubricity." (Tr., p. 68 of oral argument held November 14, 1979.)

Plaintiffs put it most succinctly in their brief to the Third Circuit: "The practical man in the shop doesn't care about theories, he looks to results." (DX A-22, Third Cir. Br., p. 19.) Defendant, after making its criticisms of the Rabinowicz tests, made the point " . . . that none of the laboratory tests can do more than confirm production experience and provide some indication of why production observations occurred." (Defendant's Comments on Plaintiffs' Proposed Fact Findings 75-110, p. 28.) Both sides appear to agree that coefficient of friction, which was all the laboratory tests were designed to measure, is not necessarily controlling in lubrication selection (Wojtowicz, Tr. 5723; Herrmann, Tr. 5018).

> Bruko D-122 (PF888), then 50 percent borax, 45 percent sodium tallow soap. Def. Ex. A-25, Bruce tab, pp. 2-3. The cure, as Pontiac found out, was to get rid of the borax, which was done. The resultant Bruko 27 soap-only lubricant worked fine and is still in use. Tr 6108-17 (Kopchick); Def. Proposed Finding No. D-4; Def. Ex. A-25, Bruce tab, pp. 1-2." (Defendant's Comment on Plaintiffs' Proposed Fact Findings 75-110, p. 3.)

From this defendant urges that the inference be drawn that borax in practice was an inferior lubricant. But the truth that emerges from defendant's example is not that borax in a lubricant made it *universally* less satisfactory. Rather it is that borax in a lubricant *on occasion* was unsatisfactory. The evidence shows that where borax-based lubricants were unsatisfactory, they were replaced. The correlative truth must be that where borax-containing lubricants were retained, or were substituted for lubricants not containing borax, it was because they did the job better. That is the inference toward which the evidence propels me.

Accordingly, I find that it is the law of the case that borax-based lubricants selected for and used in actual production met the "satisfactory lubricity" requirement of the patent and the Circuit Court decisions construing it.

B. Accused Practices Held to be Infringing

1. Accused Practices Which Must Be Held to Infringe as the Result of the Law of the Case (Bumper-Accused Practices 4, 5, 12, 13, 36, 48, 49, and 51; Non-Bumper-Accused Practices 7, 9, 16, 17, 22, 25 (in part), 26, 27, 28, 30, 31, 37, 38, 42, 47, 54, and 56)

Those practices which respond literally to Claim 4 and "achieve easy cleanability in conjunction with satisfactory lubricity" (467 F.2d at 261) comparable to the prior trial practices, must be held to infringe. On this basis I find as infringing, in addition to the already adjudicated prior trial bumper practice, the following bumper practices:

Accused Practices 4 and 5	Cadillac's use of BL 246, 247, 247A or 249 (all soap and borax) during the 1959 and 1962 model years and thereafter (APTO, CAD:1)
Accused Practices 12 and 13	Chevrolet Livonia's use of Kearns 3833 and Pennwalt 1047 (both soap and borax) during the period 1958-1965 (APTO, CL:1)
Accused Practice 36	Fisher Body's use of Bruko D-122, Kearns DF-4800, or Pennwalt Drawcote 1044 (all soap and borax) from 1957-1960 (APTO, FBC:1)
Accused Practices 48, 49, and 51	Pontiac's use of BL 246 (the prior trial lubricant but for bumper parts) from 1955-1959, and BL PTD 1239A and BL 249A (soap and borax) from late 1958-1963 (APTO, P:2)

Without trying to describe them because they are numerous, varied and fully detailed in the pretrial order, I find that the following practices for the cold-forming of nonbumper parts are literally within the Henricks claim, and produce the same combination of lubricity and cleanability characteristic of the prior trial BL 235 valve lifter and rocket practices: Accused Practice 7, APTO, CBC:1; Accused Practice 9, APTO, CD:1, Accused Practice 16, APTO, CP:1; Accused Practice 17, APTO, CP:1;* Accused Practice 22, APTO, DE:1; Accused Practice 25 (in part,** APTO, DP:1; Accused Practice 26, APTO, DR:1; Accused Practice 27, APTO, DR:1; Accused Practice 28, APTO, DR:1; Accused Practice 30, APTO, DR:2; Accused Practice 31, APTO, DR:2; Accused Practice 37, APTO, ID:1; Accused Practice 38, APTO, ID:1; Accused Practice 42, APTO, 0:1; Accused Practice 47, APTO, P:1; Accused Practice 54, APTO, SSG:1; Accused Practice 56, APTO, SSG:1.

2. TKPP is a Borax Equivalent, and the Use of it by Defendant as a Borax Substitute in Bumper Making Infringes (Accused practices 6, 14, 50, 52, and 53). TSP is also a Borax Equivalent.

(a) TKPP

By way of background, prior to the original infringement trial defendant moved to amend its complaint, which

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* Accused Practice 17 is included in a distinctive grouping by plaintiffs because molybdenum disulfide was a part of the lubricating process, although it is not claimed that use of that substance read on the patent. I should note that, while convenient for some purposes, the view I take of the infringement issues has been such as to make it inconvenient, and sometimes confusing, to follow plaintiffs' groupings. Hence I have attended upon their suggested categorizations in the reaching of the various decisions in this report, but do not separately advert to them in the writing of it.

** Accused Practice 25 involved the production of piston rods, studs and rings. For the reasons set forth at pages - , *infra,* the portion of the practice devoted to the production of piston rods has been held to be non-infringing. See particularly first footnote on page theretofore accused only borax-containing lubricants, to include non-borax equivalents. The amendment was allowed by Judge Wright, *Devex Corporation v. General Motors Corporation,* 285 F. Supp. 109 (D. Del. 1968), and a new complaint charging infringement by the use of borax substitutes was filed. See amended complaint, Princ. Doc., Tab 8d, ¶6.

The five accused bumper-making practices now to be considered involve the use of tetrapotassium pyrophosphate (TKPP) in the soap-based coating. In addition to the defenses common to all charges (no proof of better lubricity, cleanability, etc.), General Motors defends against the "TKPP" charges with the contention that there is no infringement because the melting point of TKPP is, contrary to the requirement of Claim 4, not " . . . below the melting point of the ferrous metal phosphate of said [the lubricant] coating."

I view the question of whether the use of TKPP infringes to be of substantial importance. TKPP came to be used in bumper production, where I believe the Henricks invention had its major utility. It was introduced after the patent was held valid, in an attempt to avoid infringement by adding to the then used soap composition an inorganic substitute for the borax it previously contained.

The pattern is clear.

Accused Practice 6 came to be used at Cadillac in 1964 and afterwards and involved the use of Bonderlube 201 or 202 (25% TKPP) over phosphate. It was the successor to Infringing Practice 5 which involved Bonderlube 247 and 247A (46-50% borax), or Bonderlube 249 (30% borax) (APTO, CAD:1-5).

Accused Practice 14 substituted Bonderlube 200 or 200A (20-25% TKPP) for the Kearns 3833 (45% borax) in Infringing Practice 12 at Chevrolet Livonia. The change came in early 1965 (APTO, CL:1-9).

Accused Practices 50, 52 and 53 used Bonderlube 200, 200A, 201, or 202 for bumper making at Pontiac and were the successors to a series of practices beginning with the prior trial bumper practice and ending with Infringing Practice 51 which had used Bonderlube 249A (30% borax). The TKPP use at Pontiac began with Accused Practice 52 about September 1963 (APTO, P:1-3, 6-17).

There is no evidence that TKPP was used for any purpose other than as an integral part of the soap lubricant application. TKPP was put in as a borax substitute, to help the soap do the job of efficiently lubricating the workpiece. That is why the question of whether substitution of TKPP for borax avoids infringement in the five accused processes under consideration is of more than passing significance. If the use of soap with TKPP were held not to infringe, defendant would not only have defeated the attempt to charge the five accused TKPP processes. It would have established that, at least by late 1963, another non-infringing alternative was available in the bumper area. On the other hand, if the use of TKPP as a borax equivalent infringes, it will be deducible that defendant could not readily avoid the patent's claims despite its recognition of their validity and its effort to find a non-infringing alternative.

It may be thought the question of whether TKPP in defendant's use was meltable at below the melting point of the ferrous metal phosphate of the coating is susceptible of a quick, easy answer to a scientific certainty. It has not proved to be so. Like the lawyers for both sides who have asked them the questions, the well-credentialed scientists called by the parties have differed on the melting point question.

For its part defendant points out that the handbook melting point of "ferrous [metal] phosphate" adverted to in the Henricks patent is 1050° C. (Princ. Doc., Tab 1, Col. 9, Line 9 of Table 1). The handbook melting point of anhydrous

TKPP is 1109° C.* Ergo, concludes defendant, TKPP is not meltable below the melting point of the ferrous metal phosphate, and its use does not preempt the patentee's rights. Plaintiffs reply that despite what the handbooks say about the melting point of anhydrous TKPP, in practice the TKPP in the coatings as applied by defendant would melt before the ferrous metal phosphate.

I think plaintiffs have the better of the argument.

The patent does not speak of the melting point of ferrous metal phosphate in a crucible. Claim 4 adverts to "the ferrous metal phosphate of said coating." *In situ* that would be close to the melting point of the steel coated by the phosphate (Othmer, Tr. 747, 793-812, 825-828; PX A-73a), or in the area of 1525° C. (Friedberg, Tr. 2849-2964); PX A-74). It follows from this that the TKPP in the coating, even if anhydrous, would be meltable at a temperature below the ferrous metal phosphate of the coating (1109° C. vs. close to 1525° C.).

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* While anhydrous TKPP's melting point is 1109° C. (Van Wazer, Tr. 4680-4681), hydrated TKPP has a handbook melting point of 180° C. (Othmer, Tr. 766-768; DX A-20, p. 256). A distinguished expert witness for plaintiff testified that the aqueous character of the coating recipe for the application of the TKPP would cause it to become hydrated (Othmer, Tr. 868, 869, 873-876). On the other side an expert witness for defendant testified based on x-ray patterns that, despite the seeming logic of the view of plaintiffs' expert, in fact the TKPP in defendant's coatings was not hydrated (Van Wazer, Tr. 4657-4670; DX A-24-4). Plaintiffs counter that x-ray tests detect crystal structures (Van Wazer, Tr. 4751-4752), but would be ineffective respecting the coatings here since, plaintiffs say, they are amorphous (Friedberg, App. 4, 1637-1638). Indication of loss of water vapor at relatively low temperatures in thermo-metric tests (DX A-31, p. 8; see also Van Wazer, Tr. 4657-4670), tends to support plaintiffs. If the TKPP in the coating were hydrated, the waters of hydration (or crystallization) would migrate from the chemical at 180° C. (Othmer, Tr. 766-768). Plaintiffs argue that the melting point of the hydrated compound is the melting point of the TKPP within the meaning of the patent. Its expert supported this point of view (Othmer, Tr. 737-745), and so does the chemical handbook (DX A-20, p. 256). Whether the TKPP as applied was hydrated, and whether the temperature level at which it would lose its waters of hydration is its melting point, are questions I need not decide since, in the view I take of it, plaintiffs must prevail even if the TKPP as applied were anhydrous.

Experimentally, at the infringement trial plaintiffs' expert, Mr. Friedberg, had taken a blank which had been coated with Bonderite 181X and Bonderlube 246 (15% borax) and placed it in a furnace. The temperature in the furnace was raised to 1000° C. He removed the blank from the furnace and found that all of the soap and borax had disappeared but the phosphate coating was still intact. From that test, Mr. Friedberg concluded that the borax melted before any melting of the phosphate including the zinc phosphate and the ferrous phosphate of the coating (Friedberg, App., Vol. 4,* 1572-1575; PX-79).

A similar experiment was run by Friedberg for TKPP at the accounting trial. Mr. Friedberg formed a phosphate coating on a steel panel with Bonderite 114X and coated it with Bonderlube 202, which was used in certain of the accused practices and contains 24.8 percent TKPP. He placed the panel on top of an aluminum plate provided with a thermocouple and placed the aluminum plate on an electric hot plate. He heated the assembly up to 382° C. At 93° C., the lubricant coating was liquid and boiling. It turned brown at 149° C. At 288° C. it was a darker brown and at 382° C. it was sort of bluish (Friedberg, Tr. 536-537, 545-546, 555-558, 562; PX A-61b-1). From the liquification of the lubricant mix at that temperature, Mr. Friedberg concluded that the TKPP in this system was completely meltable at 93° C. (200° F.). This result is the same as the result which he had obtained for the borax-containing lubricant that he tested for the infringement trial (Friedberg, Tr. 558, 562). Borax concededly fits the patent's melting point requirement.

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* Refers to volume of appendix filed in the appeal to the Third Circuit.

Mr. Friedberg explained that when one mixes a first chemical compound with a second chemical compound, or with several compounds, the melting point of the pure material is changed. The mixture has a new melting point (Friedberg, Tr. 696-697). This is consistent with the testimony of defendant's expert witness, Dr. Van Wazer, who explained mixtures using a chart of a TKPP and phosphorus pentoxide mixture (DX A-24, Tab b). The melting point of pure TKPP was given as 1109° C., but the melting point of the mixture was lowered as various amounts of phosphorus pentoxide were added (Van Wazer, Tr. 4723-4725A).

I find plaintiffs' explanations persuasive. Further, I note that defendant did not introduce any evidence, apart from its handbook melting points of pure anhydrous TKPP and ferrous metal phosphate, of the melting point of TKPP in the coating itself. Nor did it offer experimental proof to show that TKPP's "meltability" in the coating diverged materially from the melting point of borax as both related to the melting point of the ferrous metal phosphate.

In reaching this conclusion I have taken note that in their case against Rockwell plaintiffs filed interrogatory answers pegging the melting point of the ferrous metal phosphate of the coating at 1050° C. (DX A-48, Item 14, P. 7 and DX A-2, Item D-3, p. 4). Defendant argues that this is a wobble, and that there has been other melting point vacillating by plaintiffs. I agree, and had the issue been closer this might have been enough to tilt the decision defendant's way. But, despite plaintiffs' positional trembles, it seems to me that the evidence shows that once the ferrous metal phosphate was bonded to the workpiece its true melting point would be higher than the 1050° C. handbook melting point, and that, at the other end, the melting point of the TKPP in mixture with soap would be lower than the 1109° C. attributed as the melting point of the pure anhydrous substance.

But, defendant argues, what the Seventh Circuit saw as the "amorphous glass materials which contributed significantly to the lubricating value of the [borax-containing] coating" (321 F.2d 237), are not shown to be duplicated in TKPP-containing coating. While I agree that plaintiffs have not proved that TKPP behaves to produce the same materials as did borax, the Third Circuit recognized that variations were possible, and permissible.

> "Moreover, it may be that chemical reactions differed in degree, and perhaps in kind as well, in different applications of the Henricks process. . . . it is not claimed that in every Henricks mix under every temperature, chemical reaction and its products will be identical." (467 F.2d 261-262).

I conclude that the TKPP in Accused Practices 6, 14, 50, 52, and 53, as it existed in coating used by defendant, was meltable at a point below the melting point of the ferrous metal phosphate of said coating. The practices were used to accomplish the same results as the accused and infringing borax lubricated processes they replaced. That being so, and since as I have found they literally read on the patent, they are found to infringe.

(b) TSP

The use of Bonderlube 242, 242-O and 242-W, containing from 11 percent to 53 percent trisodium phosphate (TSP) is charged by plaintiffs in Accused Practices 3, 11, 15, and 45. The melting point controversy is about the same as the argument about TKPP, and I resolve it the same way.

Anhydrous TSP has a melting point of 1340° C. (Othmer, Tr. 866). Waters of hydration begin to migrate from hydrated TSP at 73.4° C., and this is its handbook melting point (Othmer, Tr. 789-790; DX A-20, p. 275). The Friedberg tests showed that the TSP in the coating system to which it was experimentally applied melted at 82° C. — 93° C., which was the same result he got for borax at the prior infringement trial (Friedberg, Tr. 546-548, 562; PX A-61b-1). Apart from its reliance on handbook references to the crucible melting point temperature of ferrous metal phosphate and anhydrous TSP defendant offered no evidence tending to show that *in situ* the melting point of TSP was higher than the melting point of the ferrous metal phosphate of the coating.*

C. Accused Practices Held to be Non-Infringing

1. Practices as to Which Little or No Cleaning was Required do not Infringe (Accused Practices 2, 3, 10, 11, 15, 19, 20, 21, 25 (in part), 33, 34, 35, 39, 40, 41, 44, and 45)

It has emerged as a central truth that, in general, high content (15% or more) borax or equivalent lubricants are used in bumper making with relatively light phosphate coatings, and low borax content (less than 15%) lubricants are used on heavy phosphate coatings in other manufactures.

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* While for completeness the literal sufficiency of TSP as an inorganic substance with a melting point within the patent's claims is here found, for reasons later explained none of the accused practices employing TSP are found to infringe. This is because where TSP is part of the lubricant (Accused Practices 3, 11, 15, and 45) cleanability is not shown (pp. 39-43, *infra*). And where as part of a rinse (Accused Practice 29), it is not shown to contribute to lubricity or cleanability (pp. 44-51, *infra*).

In bumpers impeccable cleaning is required to allow for unblemished plating. In processes where there is no plating, the cleaning step is less important. The prior trial BL 246 bumper process exemplifies the careful cleaning needed for bumper making (316 F. Supp. 1380-1382). The prior trial rocket and valve lifter practices (*Id.*, at 1382-1389) illustrate the much less rigorous cleaning required in many of the accused practices. As I have held, to give effect to the Third Circuit decision, accused practices in both categories must be held to infringe.

But there are a number of practices accused by plaintiffs which, unlike the prior trial practices, require either no cleaning or so little in the way of cleaning as to be insubstantial. In such cases, cleaning as such is simply not a part of the process. As to these, defendant argues that ease of cleaning is an element vital to the life of the patent, and that there can be no infringement without using that advantage.

I think defendant is correct. There can be little doubt that if the patent validity battle before the Seventh Circuit had been fought on ground involving processes requiring little or no cleaning, the patent would have been invalidated. What was found to be the happy confluence of cleanability and lubricity saved the patent from a literal construction which " . . . would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results" (382 F.2d at 23). The monopoly the Seventh Circuit sought to narrow would be broadly conferred were the patent extended to include uses of soap and borax resulting in improved lubricity only. To say it another way, construing the patent to apply to all borax-content coating achieving satisfactory lubricity, regardless of whether ease of cleanability was utilized (or indeed achieved),* would be to allow plaintiffs to "monopolize the whole broad field of metal forming" in a way that was never intended.

For their part plaintiffs rely on the proposition that a user of the substance of a patented invention will not avoid infringement by failing to utilize all the benefits of the invention. While that is certainly the law, *Hobbs v. Beach,* 180 U.S. 383 (1901); *Balaban v. Polyfoto Corp.*, 47 F.Supp. 472, 480 (D. Del. 1942), that proposition does not fit the facts here. In the matter at bar, but for ease of cleaning, plaintiffs would have no invention. This is not the case of a substitute mechanism capturing the germ of the patented machine but performing less than all of its functions. See, *e.g.*, *Hobbs v. Beach, supra* at 401. Here there would be no patent if only satisfactory lubricity was the result. The invention is not soap and borax over phosphate. It is soap and borax over phosphate producing the practical result of satisfactory lubricity and cleanability.

Applying the finding that processes which involve little or no cleaning do not infringe to the accused practices here, I find as non-infringing Accused Practices 2, 15, 19, 20, 25 (in part,* 33-35,**, 39,*** 40, and 41, all of which require no chemical cleaning (APTO, BM:5, CP:12, CT:5, DP:9-10, FBC:1, 14-15, ID:10-11, NDH:4, 6).

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* Whether those parts not actually cleaned could have been cleaned in an easy commercial way is an open question. While plaintiffs offered laboratory proof on the subject (Friedberg, Tr. 482-522), to accept those proofs in place of actual production experience would be a departure from the course followed in adjudicating lubricity.

I further find as non-infringing Accused Practices 3, 10, 11, 21, 44, and 45, which are heat-treated with the result that any surface detritus would be removed, including even the residue which it has been postulated would have been left had the German process been employed (APTO, BM:6-8, CDF:1-6, CTF:1-5, O:27-31).****

A separate word should be said about the accused practices involving TSP in the lubricant.

Although TSP has been found to qualify as an inorganic substance falling literally within Claim 4 (pp. 37-38, *supra*), its contribution to the cleanability claimed by the patent is nil. TSP-containing Bonderlube 242-O was used to make axle shafts at Buick (Accused Practice 3), and Oldsmobile (Accused Practice 45), and rear wheel spindles at Chevrolet Detroit Forge (Accused Practice 11) (APTO, BM:6-8, CTF:1-5, O:27-31). Bonderlube 242-W was used to make transmission main shafts at Chevrolet Munsie (Accused Practice 15) (APTO, CM:1-3). None of these practices was of the sort which, like the prior trial valve lifter or rocket practices, required cleaning, much less the careful pre-plating cleaning needed for the prior trial Pontiac bumper practices.

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* The portion of Accused Practice 25 involving the production of one-inch piston rods required no cleaning (APTO, DP:9-10).

** Accused Practices 33, 34, and 35 involved cold heading window regulator bearing studs and door lock striker pins, with oil being applied along the line. The only cleaning done was by a vapor degreasing step, with the door lock striker pins produced by Accused Practices 33 and 35 also requiring heat treating (APTO, FBC:1, FBC:14-15). Compare Accused Practice 32, which involved the application of oil during cold forming, and therefore required degreasing, but which also utilized prior trial cleaning steps (APTO,DE:6).

*** The accounting pretrial order is silent as to cleaning for Accused Practice 39 (APTO, ID:10-11). Cleanability has not been proved.

**** In this same category is the production of Oldsmobile pin gears for the 1961 model year. While not given an accused practice number, these were made by a process which would appear to infringe if cleanability were proved (APTO, O:34-37, especially ¶ 21).

The use of TSP to achieve lubricity only is instructive. Although literally reading on the patent, as I have found it does, to accord its use a patent monopoly would be to extend the ambit of the patent beyond those uses in which the need for commercial cleanability combines with satisfactory lubricity to create the unexpected advantage the Courts of Appeals have required. This contrasts with the use of TKPP as a borax substitute in bumper making, which I have held does infringe because such practices did require, and did achieve, commercial cleanability.

2. Practices in Which Borax Rinses were Used as Neutralizers do not Infringe (Accused Practices 1, 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 43, 55, 57, and 58).*

Plaintiffs charge as infringing a number of processes where borax was used in the rinse to which the metal blank was subjected after phosphating but before the application of the soapy lubricant. These practices, all differing from the prior trial practices where the borax was an integral part of the lubricant, are as follows:

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* It should be noted that of these accused practices five have been held in the preceding non-infringing because not cleaned (Accused Practices 2, 20, 34, 35, and 39), and two will also be held non-infringing at pages 53-56 hereafter on factual grounds (Accused Practice 1 in part, and Accused Practice 8).

> Accused Practice 1. Bonderlube 265 (soap only) following a Parcolene 21 borax-containing rinse (APTO, ACSP:1-2).
>
> Accused Practices 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 55, 57, and 58. Bonderlube 234 (soap only) following Parcolene 21 or Stancote L borax-containing rinses (APTO, BM:1, CBC:1, CP:1, CT:1, DM:1, 5-7, DE:1, FBC:1, ID:1, SSG:1-3).
>
> Accused Practice 43. The Oldsmobile usage of J&L Steel in the period from January 1962 through model year 1963, where MA88 borax-containing rinse was allegedly used (APTO, O:1).

Plaintiffs argue that the use of a borax (or equivalent) rinse infringes since it causes borax to be deposited on the workpiece to be combined with the then-applied soap film atop the phosphate on the workpiece. Splitting one step of a process into two does not avoid infringement where the combined steps and the original process are substantially identical or equivalent in terms of function, manner and result. *Matherson-Selig Co. v. Carl Gorr Color Card Inc.*, 301 F.Supp. 336, 349 (N.D. Ill. 1967). Thus, plaintiffs say, the purpose and effect of a borax-containing rinse is the same as if borax were already combined in the soap.

Plaintiffs begin with the submission that borax-containing rinse deposits borax on the workpiece (Othmer, Tr. 763-764; Rabinowicz, Tr. 117-175; PX A-2i). While they offered no credible quantitative proof as to amount of borax from the rinse likely retained in the coating after the lubricant bath, I am inclined to credit the testimony that at least some borax stayed on the workpiece. Plaintiffs also point to Dr.

Rabinowicz' laboratory tests which they say prove that borax and TSP dipped workpieces are more slippery in pin-on-metal tests than phosphate and soap coated blanks without intermediate borax or TSP rinses (Rabinowicz, Tr. 117-178, PX A-16; Rabinowicz, Tr. 208, PX A-25).

Again I need not resolve the conflict between Dr. Rabinowicz' tests and the varying laboratory results reached by defendant's expert, Dr. Ludema. For, as the Third Circuit found production experience superior to chemical disputation as to how the result occurred, so I, in applying the law of the case, have decided to give controlling weight to in-production lubricity and cleanability, rather than differing laboratory predictions as to how particular lubricants might be expected to behave on the cold-forming line. Applying the same reasoning here, I find Accused Practices 1, 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 43, 55, 57, and 58 to be non-infringing. Here is why.

(a) Put negatively, there was not a shred of evidence that borax (or equivalent) rinses were employed for the purpose of enhancing either the lubricity of the workpiece, or its post-formation cleanabilty.

(b) The record as a whole demonstrates that the only purpose of the borax in the accused rinse processes was to neutralize acid carryover from the phosphate bath. The acid liquid from the phosphate bath tends to remain on the work and be carried over into the lubricant bath. The action of the soap in the lubricant, as well as the life of the soap bath, is adversely affected by such carryover (Gibson, Tr. 1727-1730). "Rinsing techniques are quite necessary" (Henricks, Tr. 3721), since they neutralize the acid phosphate carried on the work before the work reaches the soap bath (France, Tr. 7387-7388). This could be done by a vigorous water rinse (Wojtowicz, Tr. 5738-5739).

It can also be done by adding sodium hydroxide to the soap bath from time to time so as to restore the pH of the soap bath (Gibson, Tr. 1729-1731).

A chemical neutralizing rinse is another way to overcome this problem (Henricks, Tr. 3721-3722). The chemical neutralizer undergoes chemical reaction with the acid phosphate carryover on the work and brings the pH or acidity to a value similar to that of the soap bath, so that the lubricant is not adversely affected by the carryover. This purpose and action of neutralizer rinses is described in Parker (Hooker) technical papers and customer literature, as well as in such literature of Amchem and other suppliers (*e.g.*, DX A-25, Parker tab hand pages 131-148; Pennwalt tab, page entitled "Fosrinse R-1"), and was the subject of testimony by Messrs. Wojtowicz of Montgomery and Gehman of Amchem (Gehman, Tr. 3990-3996; Wojtowicz, Tr. 5738-5739). Townsend of Delco Remy likewise so testified (Townsend, Tr. 3878). This record testimony stands uncontradicted.

(c) The use of borax as a neutralizer in a rinse was recognized by Henricks himself in Example XXXV of his 1950 patent application which discusses a cold-forming process using zinc phosphate followed by a borax-containing rinse (PX 3, p. 63). In the words of the example, after a zinc phosphate coating the work " . . . was given first a cold running water rinse followed by a hot borax rinse of 1½ to 2 ounces per gallon of borax *to neutralize any acid residue.*" (Italics added. *Ibid.*) Henricks cancelled that example when the patent examiner required that the specification be shortened and limited to "such parts of it as are commensurate with claims that applicant will continue to prosecute" (PX 3 at pp. 63, 106.)

This disclaimer of Example XXXV as outside of the claims was entirely consistent with the Henricks testimony that neutralizing rinses were old and well known, and not his invention.

(d) Henricks' understanding of the use of borax as a neutralizer in withdrawn Example XXXV was not the product of a flash insight. The use of neutralizing rinses, including both borax and trisodium phosphate to overcome the acid entrained on zinc phosphate rust-proofed treated work is disclosed in U.S. Patent 2,120,212 (1938) (DX A-54). Whether this, and other contended-for examples of prior art are sufficient to avoid the extension of the patent to rinses is a question of law with which I need not grapple, since it is obvious that Henricks did not invent borax as a neutralizing rinse, and did not claim to.

(e) The evidence is uniform to the point that defendant *thought* it was using borax rinses to neutralize acidity, and not to get added lubricity or cleanability. There are also good indications that defendant did not in fact achieve better lubricity or cleanability from the use of borax rinses.

For example, Accused Practice 1 involved a heavy phosphate coating (Bonderite 181X) with a soap (BL 265) coating preceded by a borax (Parcolene 21) rinse. The practice ran from 1959 to 1963. In 1963 defendant adopted Non-Accused Practice A in which the borax neutralizing rinse was replaced with a non-borax neutralizing rinse (APTO, ACSP:1-6).* The non-accused practice continued from 1963 until the expiration of the patent in 1969. Since there was no different cleaning employed, it is inferable that the presence of absence of borax in the rinse did not affect cleanability.

The same pattern appears with equal sharpness in the production of universal joint bearing races and propeller shaft ends at Chevrolet Parma. From 1957 to May 1963 a borax rinse was used after phosphating and then a highly boraxed soap lubricant added (Accused Practice 17). From May 1963 to May 1964 the borax was taken from the lubricant but the borax rinse retained (Accused Practice 18) (APTO, CP:1-9). From May of 1964 onward the borax rinse was abandoned in favor of a non-borax neutralizer (Non-Accused Practices K and L) (APTO, CP:1). Neither the alleged lubricity nor cleanability features of Henricks' Claim 4 appear to have been missed.

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* For finding as to changeover, see pages 54-55, *infra*.

(f) The prior trial practice by Diesel Equipment Division of making hydraulic valve lift plungers involved, it will be remembered, BL 235 which contained 3 percent borax and 2 per cent sodium nitrate. The prior trial Pontiac rocket practice involved the same lubricant. These were held to be non-infringing by Judge Wright and, for reasons previously expressed, must now be regarded as infringing as a result of the Third Circuit's reversal. But both prior trial practices *also* involved borax rinses (Parcolene 21 and 20, respectively) (APTO, DE:1; P:1). As best as I can tell plaintiffs did not urge this circumstance as an additional argument in favor of infringement, although such an argument might have been expected had plaintiffs believed the function of the rinse was to deposit more borax on the workpiece. The two referred-to prior trial practices (borax rinse plus borax lubricant) were not unique. See, *e.g.*, Accused Practices 17, 40, 41, 47, 48, 49, and 56.

(g) If, as plaintiffs now suggest, accused rinse processes had an effect of enhancing lubricity and cleanability by dispensing more borax on the part being cold-formed, the direct way to have accomplished that result would have been to include a higher quantity of borax in the already borax-containing lubricant. If borax in the rinse were supposed to serve the same purpose as borax in the lubricant, the purpose could be accomplished more easily (and probably more cheaply) without the rinse. The logic that the borax in the rinse was aimed to do something other than what was accomplished by the borax in the lubricant seems inescapable, and entirely compatible with the rinse-as-a-neutralizer testimony.

Accordingly, the practices in which borax was used as a neutralizer in the rinse, are not infringing.

3. Practice in which a Trisodium Phosphate Rinse was Used as a Neutralizer does not Infringe (Accused Practice 29)

Trisodium phosphate (TSP), found to be an equivalent inorganic substance fitting within Claim 4,* was used in a neutralizing rinse as part of Accused Practice 29. In that practice numerous products were cold-formed at defendant's Delco Remy division through the use of a trisodium phosphate rinse as an intermediate step after the metal was phosphate coated and before the application of Montgomery DF 1101 soap (APTO, DR:1-2).

The same reasoning for finding non-infringement of the borax neutralizing rinses applies with equal force to the TSP rinse in Accused Practice 29. Indeed, the function of the rinse step as neutralizing the acidity of the phosphate undercoat rather than as enhancing lubricity or cleanabilty is shown by the shifting in and out of this practice to non-accused rinse techniques. For example, the DC generator frame was one of the parts made by Accused Practice 29. The frame was made with the help of a TSP neutralizing rinse from November 1954 to August 1957. Both before TSP was used (1951-1954) (APTO, DR:7) and later (after 1957), a water immersion was substituted (*Id.*). The water immersion is Non-Accused Practice Y (APTO, DR:3, 12). The use of an intermediate water rinse bracketed the use of TSP. The only purpose TSP could have served was to avoid the pH problem in the soap bath.

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* See pages 37-38, *infra*.

Accused Practice 29 supports the conclusion that the neutralizing rinses were not in design or result related to lubricity or cleanability.

4. Practices Determined not to Involve the Use of Borax (or Equivalents) do not Infringe (Accused Practices 1, 8, and 46).

Considering the many years which have elapsed, the parties have done a remarkable job in retrieving information respecting the accused processes. The result was the formulation of Appendix II to the Accounting Pretrial Order, containing agreements as to the operation of the accused practices, their duration, the materials used, parts produced, etc. The assemblage of these materials saved weeks of additional testimony and eliminated large areas of potential controversy.*

While the vast bulk of the processes were described by agreement, a few disputes remain. Although they involve almost entirely the question of whether borax rinses were used, and such has been held in the preceding section to be non-infringing, in the interest of completeness the disputes will now be resolved.

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* In their post-trial brief plaintiffs charge defendant with various acts of bad faith, including assaults on its trial tactics. These are generally considered as part of the discussion of multiple damages at pages 66-70, *infra*. In a specific way, however, I will here note that defendant merits a major share of the credit for the formulation of Appendix II of the pretrial order. Its counsel could have used their client's economic muscle to try to uncompromisingly put plaintiffs to their proof in every detail, thus prolonging the case, and maximizing plaintiffs' burden. Instead defendant was flexible, cooperative and forthcoming. Its willingness to pull the laboring oar in the formulation of the pretrial order was in this spirit.

(a) Accused Practice 1 (After 1963)

Accused Practice 1 charges the use by defendants beginning in 1959 at its AC Spark Plug Division of a Parcolene 21 borax rinse to help cold form spark plug shells and shields (APTO, ACSP:1). The rinse was applied by Braun Engineering which precoated the steel. Plaintiffs contend that Parcolene 21 rinse was continued after 1963. Defendant argues that in 1963 Braun came to use Parcolene 24, a non-borax rinse.

Neutralizing rinses of the sort represented by Accused Practice 1 have already been found to be non-infringing. And in another case it might be left at that, since that finding moots the dispute. But here it seems right to tie up as many potential loose ends as possible. Hence, I decide the question.

On defendant's side is direct testimony from Ross Perry, formerly of Parker, who initiated the change at Braun from Parcolene 21 to Parcolene 24 (Perry, Tr. 6590-6591, 6605-6618). Perry testified the change occurred in 1963 (Perry, Tr. 6630). See also, Tr. 6622-6624, DX A-27-2.

Against this plaintiffs cite an affidavit by Braun indicating the use of a Parker "Borox" dip (PX A-267). The Braun attestation was based on information furnished by a then Braun employee named Affeldt (PX A-435). Mr. Affeldt testified on deposition that his memory at the time he made his affidavit was that the rinse continued to be borax (PX A-436). Despite this, relying on Parker sales summaries prepared for this litigation (DX A-77-5; PX A-428), Braun changed its interrogatory answer to eliminate the reference to a borax rinse.

The original Parker records were destroyed in 1976. Although there is evidence that the destruction was inadvertent (PX A-428), plaintiffs argue that the circumstances are suspicious and the destruction inexcusable.

Having considered both sides, I find that Braun ceased to use Parcolene 21 in 1963. I do because, quite apart from the Parker sales summaries, I give credit to Ross Perry, the witness who so testified.*

(b) Accused Practice 8

As with Accused Practice 1, the parties are in controversy respecting whether rinses did or did not contain borax. The practice was employed at Chevrolet Bay City to form steering knuckle parts and other miscellaneous parts. (Accused Practice 8 does involve one small claim of a direct borax-containing lubricant.)* (PX A-20).

The argument about the content of the rinses again centers on the reliability of the Parker sales summaries (DX A-77-5) balanced against plaintiffs' showing that defendant's own standard purchase orders at least arguably required a borax neutralizer (APTO, CBC:11). Although agreeing with plaintiffs that the Parker summaries are somewhat tainted, there is no reason to think they are faked. It seems to me that they are better evidence than inferences to be drawn from purchase order language. Hence, while the issue is close, defendant has a little the better of it.

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* In 1968 AC began to make its own spark plug shells. These shells were coated identically to what I have found the post-1963 Braun process to have been (Non-Accused Practice A, APTO, ACSP:1). It is undisputed that Parcolene 24, not Parcolene 21 was used as the neutralizer (APTO, ACSP:2). The change from Parcolene 21 to Parcolene 24 by Braun in 1963, and the continued use of Parcolene 24 by defendant in 1968, is another example of the ability to shift from one neutralizing rinse to another with no evident loss of lubricity or cleanability.

* Sixteen of the nineteen 1967-1969 invoices submitted by Youngstown Sheet and Tube describe the coating Lansing applied as "zinc phosphate coat with Bonderite 181X, neutralize with Parcolene 21 and lubricate with Bonderlube 235 (5 minute min.) or equivalent". The other three state "zinc phosphate coat, neutralize and lubricate suitably for our Boltmaker operation" (PX A-227E). BL 235 is one of the prior trial borax-containing lubricants.

(c) Accused Practice 46

Accused Practice 46 charges the use by Oldsmobile of precoated steel purchased by defendant from Jones and Laughlin from about September 1963 through March 1969 (APTO, O:2). The question is the character of the coating.

It appears that from January 1962 through the 1963 model year, defendant's Oldsmobile plant had gotten bumper steel from Jones and Laughlin precoated on J&L's behalf by Precision Metal Coating Company. The coating process consisted of phosphating the steel and lubricating it with DA 2481, a Montgomery vegetable oil substance known as "Kold-Lube" (DX A-51-11, pp. 8-9) and containing no inorganics. In between the phosphating and lubricating, there was a borax neutralizing rinse, MA-88. This is Accused Practice 43 (APTO, O:13-14), which I have previously held to be non-infringing along with the other rinses.

Beginning in September 1963 J&L began to do the precoating itself. This is Accused Practice 46. As with Precision Products, the lubricant used by J&L was the without-organics Kold-Lube (DX A-51-11, pp. 8-9). There is no direct evidence that J&L thereafter used borax either in the lubricant mix or as a rinse. There is weighty direct evidence to the contrary. Witnesses Alexin, Butler, and Pomietto, each of whom participated in and had knowledge of the J&L Surfaglaze coating operation, testified that no material other than the phosphate and the lubricant were introduced at any point in the process (Alexin, Tr. 5274; Butler, Tr. 5327-5331; Pomietto, Tr. 5340-5341, 5344-5346).

Plaintiffs' strongest piece of evidence to the point that borax was used in the J&L coating comes from the testimony of its expert Gavilovic. Dr. Gavilovic tested J&L samples run in 1974 with the same coating technique it had used since 1963. Using electron microprobe (Gavilovic, Tr. 953-954) and ion microprobe (*Id.* at 955, 957) analytical techniques, Dr. Gavilovic found boron in the samples (Tr. 1011-1013), which finding is consistent with the presence of borax (*Id.* at Tr. 1014-1015). Dr. Gavilovic's finding of boron in the samples I accept as fact. His conclusion that the boron necessarily evidenced the addition by J&L of borax I do not. Apart from the expert evidence which tends to undercut Dr. Gavilovic's conclusion (*e.g.*, Evans, Tr. 4489-4492; Vergosen, Tr. 4437), principally I am persuaded by the evidence of the witnesses who had actual first-hand knowledge of the J&L process, and who denied the use of borax in the lubricant or as a rinse.

I am also moved to this conclusion by plaintiffs' effort (Pl. Br. 61-63) to equate what is contended to be borax in the J&L coating with the borax in BL 235, citing Gavilovic (Tr. 8911). That J&L would have used the prior trial BL 235 lubricant to precoat bumper steel is not likely. The prior trial practices, using the relatively low borax BL 235 with heavy phosphate coatings to cold-form parts not usually requiring plating, are fairly typical of the use of that lubricant in the broader pattern of accused nonbumper practices tried out before me. In bumper making, by way of contrast, the pattern was to use a higher borax (or equivalent lubricant) over light phosphate. If J&L used BL 235 to coat the steel it was providing Oldsmobile for bumper forming, it would be the only example of that coating for that use in this case.

I conclude Accused Practice 46 does not infringe. Plaintiffs finally argue in the alternative as to Accused Practice 46 that it be found that BL 200, 201, or 202 (soap and TKPP) was used by J&L, if borax was not. This submission seems inconsistent with the Accounting Pretrial Order, in which plaintiffs, after J&L's process description of Accused Practice 46, stipulate that: "Plaintiffs do not accept the above representation of Jones & Laughlin and *contend that borax was applied to the steel* after it was phosphate coated." (Underlining added. APTO, O:16). But even were plaintiffs free to make a contention it appears they did not reserve, the case for a TKPP rinse at J&L is far weaker than the claim of a borax rinse. The borax hypothesis, which I have rejected, at least had behind it the testimony of a respected expert. The TKPP alternative submission is utter speculation.

D. Explanation and Table

To make a punctuation mark between the segment of the report (infringement) now concluded, and what follows (damages), a table has been prepared collecting in a short space the conclusions heretofore reached as to which practices (in addition to prior trial practices) infringe, which do not, and why:

TABLE

Accused Practice	Infringing Practices			Non-Infringing Practices		
	Practices controlled by prior trial bumper practice (a)	Practices controlled by prior trial non-bumper extruded parts practices (b)	Practices substituting TKPP for borax in bumper lubricants and providing lubricity and cleanability analogous to prior trial bumper practices (c)	Practices in which cleanability not shown (d)	Practices using borax or TSP as a neutralizer only - not shown to have purpose or effect of enhancing cleanability or lubricity (e)	Practices in which no borax (or equivalent) shown to be used (f)
1					X	X (after 1963)
2				X	X	
3				X		
4	X					
5	X					
6			X			
7		X				
8					X	X
9		X				
10				X		
11				X		
12	X					
13	X					
14			X			
15				X		
16		X				
17		X				
18					X	
19				X		
20				X	X	

TABLE

Accused Practice	Infringing Practices			Non-Infringing Practices		
	Practices controlled by prior trial bumper practice (a)	Practices controlled by prior trial non-bumper extruded parts practices (b)	Practices substituting TKPP for borax in bumper lubricants and providing lubricity and cleanability analogous to prior trial bumper practices (c)	Practices in which cleanability not shown (d)	Practices using borax or TSP as a neutralizer only - not shown to have purpose or effect of enhancing cleanability or lubricity (e)	Practices in which no borax (or equivalent) shown to be used (f)
21				X		
22		X				
23					X	
24					X	
25		X (in part)		X (in part)		
26		X				
27		X				
28		X				
29					X (TSP only)	
30		X				
31		X				
32					X	
33				X		
34				X	X	
35				X	X	
36	X					
37		X				
38		X				
39				X	X	
40				X		

41				X		
42		X				
43					X	
44				X		
45				X		
46						X
47		X				
48	X					
49	X					
50			X			
51	X					
52			X			
53			X			
54		X				
55					X	
56		X				
57					X	
58					X	
Totals	8	17	5	17	16	3

III. DAMAGES

A. Introduction

Plaintiffs claim that defendant's infringements warrant a compensatory award of $121 million. They also request interest which, were their compensatory damage claim fully allowed, would amount to about $141 million. Finally plaintiffs seek treble the amount of the claimed damages (*i.e.*, an additional $242 million) together with attorneys' fees of about $1.5 million. Hence, plaintiffs reach for a recovery of about one half billion dollars.

Not surprisingly, defendant dissents. It submits that as a matter of law and fact plaintiffs' recovery cannot include multiple damages or attorneys' fees. And it argues that even were plaintiffs to have proved that each of the accused practices infringed, damages could be no higher than $200,000. Lastly, defendant disputes plaintiff's right to interest.

In resolving these not-insubstantial disagreements I have opted first to decide the claims for multiple damages and counsel fees. Next determined will be the standard to be applied in arriving at a reasonable royalty. Thereafter, the facts relating to the usefulness of the Henricks process in bumper making and the forming of non-bumper parts will be found, and various of the parties' damage-related arguments will be resolved. Thus will the stage be set for the construction of hypothetical negotiations leading to a "reasonable royalty." Which will leave only the legal question of plaintiffs' entitlement to prejudgment interest to be decided. At the end will come the accounting.

B. Denial of Plaintiffs' Claim to Multiple Damages and Attorneys' Fees

Plaintiffs seek trebled damages under 35 *U.S.C.* § 284, which provides that "the Court may increase the damages up to three times the amount found or assessed." This is a penalty provision. It is discretionary, and applicable only if there is egregious conduct by the defendant, such as conscious, deliberate and willful appropriation of the patented invention without good faith belief of patent invalidity or non-infringement, which makes out a gross case of unreasonable conduct, and where the plaintiff has been blameless. *Enterprise Mfg. Co. v. Shakespeare Co.*, 141 F.2d 916, 920-921 (6th Cir. 1944); *General Motors v. Dailey*, 93 F.2d 938, 942 (6th Cir. 1937); *Sel-O-Rak Corp. v. Henry Hanger & Display Fixture Corp.*, 159 F. Supp. 769, 777 (S.D. Fla. 1958), *aff'd*, 270 F.2d 635 (5th Cir. 1959); *Wahl v. Carrier Mfg. Corp.*, 511 F.2d 209, 214 (7th Cir. 1975). An award of multiple damages typically requires willfulness by the infringer. *W. L. Gore & Associates, Inc. v. Carlisle Corporation*, ____F. Supp. ____, Slip Opinion at p. 4 (D. Del. 7/26/79). Where the question of validity is close, or novel, it has been held to be an abuse of discretion to award treble damages. *Yoder Bros., Inc., v. California-Florida Plant Corp.*, 537 F.2d 1347, 1383-1384 (5th Cir. 1976), *cert. den.*, 429 U.S. 1094 (1977).

The statute at 35 *U.S.C.* § 285 provides that "[t]he court in exceptional cases may award reasonable attorney fees to the prevailing party." The courts have confined attorney fee awards to those cases where exemplary and punitive relief is required because of bad faith, fraud, malice or similar unconscionable conduct. *ADM Corp. v. Speedmaster Packaging Corp.*, 525 F.2d 662, 664 (3d Cir. 1975); *Uniflow Manufacturing Co. v. King-Seeley Thermos Co.*, 428 F.2d 335 (6th Cir. 1970), *cert. den.*, 400 U.S. 943 (1970). An award is contraindicated in a hard and fairly fought case involving difficult and doubtful points of law. *Pierce v. Allen B. Du Mont Labs, Inc.*, 297 F.2d 323, 329-30 (3d Cir. 1961). See *Dixie Cup Co. v. Paper Container Mfg. Co.*, 169 F.2d 645, 651 (7th Cir. 1948); *W. L. Gore Associates v. Carlisle Corporation, supra*, at p. 14 of Slip Opinion.

The most obvious stumbling block to plaintiffs' argument is that two highly respected jurists have reached the selfsame conclusions for which plaintiffs now accuse defendant of bad faith. Judge Robson in 1963 held the patent invalid (Princ. Doc., Tab 2). Judge Wright in 1970 held the patent had not been infringed. 316 F.Supp. 1376 (D. Del. 1970). Although both decisions were subsequently reversed, plaintiffs cannot brush General Motors' defense of its accused practices with the paint of egregious unreasonableness without splashing the same contumacious color on the decisions of these able judges. Plaintiffs have cited no case in which a defendant under such circumstances has been held to have acted in bad faith or in reckless disregard of the patentee's rights. This will not be the first.

The view which I take, *i.e.*, that the prior court findings of invalidity and non-infringement are incompatible with charges that defendant was guilty of *mala fides* or reckless wrongdoing, makes it unnecessary to consider in detail plaintiffs' barrage of particularized misconduct allegations. Nonetheless, I separately find that neither singly or in combination do the charges as to defendant's behavior involve the quality of misconduct required to sustain a multiple damages award or to meet the possibly less stringent test for awarding attorneys' fees.

For example, plaintiffs charge defendant with arrogance for relying upon agreements from its lubricant suppliers indemnifying it against the risk of being adjudicated an infringer. To the contrary, I find the willingness of suppliers to give indemnifications in the circumstances here to support defendant's good faith in independently concluding that its practices did not infringe.

Another signal of defendant's bad faith, say plaintiffs, is its failure to have secured an opinion of outside counsel to buttress its own patent invalidity, non-infringement conclusions. While there may be cases where the procuring of outside counsel's opinion proved good faith, or its absence evidenced willfulness, this case is not one of them. Defendant's in-house patent attorneys have shown themselves to be eminently knowledgeable and superbly well qualified in the field of their expertise. Their views as to invalidity and non-infringement were sufficiently substantial to have won the support of Judges Robson and Wright. That it has been finally adjudicated they were in error is no cause to penalize defendant for relying on them.

Treating conclusorily with other of plaintiffs' "bad faith" contentions, I decline to find that defendant purposely withheld information, that it attempted to mislead the Court, that it took no reasonably effective steps to retain records, or that taken as a whole its responses to plaintiffs' pretrial discovery were calculated to deceive plaintiffs and their experts.

Having considered plaintiffs' various submissions, the history of the case and the record in its entirety impel me to conclude that defendant acted in good faith and not recklessly. There will be no punitive award in the shape of multiple damages. And plaintiffs will pay their own counsel fees.

C. Standard to be Applied in Determining a Reasonable Royalty

The statutory provision at 35 *U.S.C.* § 284 mandates the award of " . . . damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer. . . ."* *Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 533 F.2d 126, 129 (3d Cir. 1976).

Where, as here, a patentee has not itself practiced the patented process or itself made, used, or sold the patented product, the patentee suffers infringement damages only in the amount of a reasonable royalty. In setting the reasonable royalty in such a case, account should be taken of the inability of plaintiff to benefit from the patent other than by collecting royalties, and the amount a reasonable licensee would agree to, each mindful of the fact that the licensor cannot benefit from the patent except by collecting royalties. *Trio Process Co. v. L. Goldstein's Sons, Inc., supra,* 533 F.2d at 129; *Ellipse Corp. v. Ford Motor Co.*, 461 F. Supp. 1354, 1362 (N.D. Ill. 1978).

The only rational way to determine reasonable royalties is by reference to hypothetical negotiations. Such negotiations are assumed to be between a reasonable prospective licensor and a reasonable prospective licensee, each of whom is informed as to the relevant facts. The factors that would enter into a royalty determination in such hypothetical negotiations control the reasonable royalty to be awarded in an infringement suit. *Egry Register v. Standard Register,* 23 F.2d 438, 443 (6th Cir. 1928); *Horvath v. McCord Radiator & Mfg. Co.*, 100 F.2d 326, 335 (6th Cir. 1938); *Georgia-Pacific v. U.S. Plywood,* 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified,* 446 F.2d 295 (2d Cir. 1971), *cert.den.* 404 U.S. 870 (1971).

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* Section 284 differs from Section 4921, R.S. (the law prior to August 1, 1946) which permitted the patentee to recover the "profits to be accounted for by the defendant," as well as the "damages the complainant has sustained." 1 *Walker, Patents* (Deller Ed. 1937) p. 628; *Aro v. Convertible Top Replacement Corp.*, 377 U.S. 476, 507 (1964); *Dowagiac Mfg. Co. v. Minnesota* ______________________________ *(1915).*

D. Resolution of Disputes as to Factors to be Considered in Fixing a Royalty

From the foregoing legal propositions neither side dissents. Where they come apart is in their respective views of what the hypothetical negotiators would as a matter of fact, and could as a matter of law, have considered in the bargaining process. The parties' contentions are prolix, and sometimes run on separate tracks. In sorting them out, I first find the facts relating to the usefulness of the Henricks process in the manufacture of bumpers, and then in the making of non-bumper parts. In the course of so doing the general effect of what will have been found as to defendant's use of the patent on plaintiffs' damages theories will be considered. Thereafter dealt with will be contentions advanced by defendant as to certain arguably value-diminishing factors. With this groundwork laid, the bargaining will be hypothesized and license terms (including a reasonable royalty) will be found.

1. An Overview

The parties agree that such advantages as the patent offered would have been taken into account by the hypothetical negotiators. They collide in their views as to just what those advantages were. Plaintiffs are lyrical in their praise of the Henricks process. Defendant trivializes it. Between plaintiffs' rhapsody and defendant's dirge lies the truth.

Because the discussion which will follow is lengthy, some initial comments about the parties' contentions will supply perspective.

The most important single disagreement between the parties centers on the question of whether defendant could have cold formed bumpers (and non-bumper parts) without the Henricks process. As plaintiffs see it, defendant had the choice between (i) infringing, by use of a cold forming operation, or (ii) not infringing by use of expensive "hot forging" and machining processes. Positing this as the choice, plaintiffs compare the benefit of cold forming using Henricks, with the cost and difficulty of other-than-cold-forming processes. By this comparison they seek credit for a portion of the defendant's royalty savings and gains which they allege came from using the Henricks process.

On this basis plaintiffs ask a royalty of 2.4 per cent of the sales price of defendant's bumpers to its dealers, for a total bumper royalty, assuming all processes accused in fact infringed, of $70,132,764. In the area of non-bumper parts, plaintiffs ask not a percentage of sales but of the savings and gains, again contrasting the cost of Henricks and the cost of hot forging or machining, on the continued hypothesis that but for defendant's use of their invention those would have been its only alternatives. Plaintiffs calculate defendant's savings and gains in the manufacture of non-bumper parts at $90,522,607. Of this figure they seek 56.16 per cent, or (assuming all accused processes in fact infringed) $50,833,172.

Plaintiffs' difference in approach between valuing their invention in bumper manufacture and valuing it in the making of non-bumper parts is not without foreseeable consequences. In the bumper segment of their claims, plaintiffs have a fallback. For if the premise that defendant could not have cold formed bumpers except with Henricks is found to be fallacious, an evidential basis for the making of an award nevertheless exists. Bumper sales figures were proved, and a percentage figure may be rationally derived to apply to those sales by way of reasonable royalty even if (contrary to plaintiffs' contention) other non-infringing cold forming alternatives were available.

In plaintiffs' non-bumper claims, however, no such fallback is available. For by relying solely on savings and gains, plaintiffs supplied an all or nothing-at-all choice. Their comparison was between Henricks and machining or hot forging. The premise for which they advocated was that parts could be cold formed only through Henricks. The comparison between Henricks and machining or hot forging produced the savings of which they seek a share. But if non-bumper parts could be cold formed without Henricks, the comparison fails. *No savings and gains were proved between Henricks and other non-bumper cold forming alternatives, since plaintiffs elected to place sole reliance on the proposition that no such alternatives were available. And no sales figures for non-bumper parts were supplied such as might allow the development of a percent-of-sales royalty.*

The discussion which follows will first treat with the usefulness of the Henricks process in the making of bumpers. It will be found that the invention was advantageous, but not preemptive of the cold forming field. Although rejecting plaintiffs' proposition that there were no non-infringing alternatives available, the findings of value allow for hypothetical negotiations in a quantifiable way.

The findings as to the value of the invention in the cold forming of non-extruded parts will be otherwise. It will be found that there were numerous, often-used, non-infringing cold forming alternatives at hand to defendant, contrary to plaintiffs' claim that the defendant's choice was between Henricks and hot forging or machining. It will be concluded that in the non-bumper area the invention was of some (although not great) value, but that plaintiffs' savings and gains evidence makes it impossible to quantify such value as it had in a legally acceptable way.

2. The Usefulness of the Henricks Process in Bumper Making

It was in the area of bumper manufacture that the Henricks invention found its greatest utility. Here it was that the high borax (or TKPP) lubricant taught by the patent found its greatest use. And it was in bumper making that cleanability, claimed by Henricks as a hallmark of his invention, was shown to be most needed as a predicate to plating.

But it is too much to claim, as plaintiffs have, that defendant would have been unable to cold form bumpers with reasonable commercial success absent the Henricks process. In fact, Henricks was thought by various of defendant's divisions to be a superior lubrication system for bumper making, but it was not the only system. The experience of each of defendant's divisions bears out this conclusion.

(a) Oldsmobile Bumpers

It is highly significant that during the entire life of the patent, Oldsmobile successfully made bumpers without using the Henricks process.

The early Oldsmobile process for cold forming bumpers from December 1949 to November 1953 was a non-infringing alternative (Non-Accused Practice KK). Phosphate and a variety of other non-borax or equivalent lubricants were used from November 1952 to the January 1965 model year (Non-Accused Practices LL, MM and NN) (APTO, O:3). Accused (but I have decided non-infringing) Practice 43 was used for a time in 1962 and 1963, and Accused but non-infringing Practice 46, from September 1963 to March 1969 (APTO, O:1, 2). In short, Oldsmobile was successful in cold forming bumpers without the use of the Henricks process during the entire life of the patent. And its election to use non-borax (or equivalent) lubricants came despite its familiarity through usage of a high borax-containing lubricant to make rocket hardware in Infringing Practice 42, from June 1953 to January 1954 (APTO, O:1, 6).

Recognizing that the Oldsmobile attachment to non-infringing processes runs flatly counter to the preemptive advantages which they claim for the Henricks process, plaintiffs make two efforts to undercut the significance of the Oldsmobile experience.

First, plaintiffs point out that Oldsmobile Non-Accused Practice KK, running from December 1949 to November 1953, involved the application of Montgomery DQ 593 over phosphated flat polished, steel blanks (APTO, O:11-12). Montgomery DQ 593 is a wax-type lubricant which contains Degras castor wax, soap and (according to plaintiffs) 2.73 percent trisodium phosphate (Wojtowicz, Tr. 5665-5667). Although plaintiffs in the pretrial order have elected not to accuse the practice, they urge that defendant must affirmatively prove it does not infringe in order to rely on it as a non-infringing alternative. Defendant responds that it was entitled to assume that plaintiffs regarded the non-accused process as non-infringing, and that in all events the lubricant composition for Non-Accused Practice KK as sold to General Motors, had .59 percent trisodium phosphate and that the purpose of the TSP was to stabilize the emulsions (Tr. 5667).

Defendant has the better side of this argument. I do not find that the use (if it was used) of a relatively trivial amount of TSP as an emulsifier (which contrasts with the much larger borax or equivalent percentages in infringing bumper processes) contributed to lubricity or cleanability. There is no merit to plaintiffs afterthought-effort to charge as infringing at trial what they had up to then opted to style as Non-Accused Practice KK.*

Plaintiffs also argue from a reference in a 1959 letter from a Pontiac employee to the Oldsmobile process as a "soap-boraz [sic] lubricant" (PX A-288), that Non-Accused Practices LL and MM were in fact infringing. They use the letter as the basis for a claim that they were in error in agreeing in the Accounting Pretrial Order to a description of those non-accused practices (LL and MM) as not containing borax. Although I would consider releasing plaintiffs from their stipulation if it were necessary to do justice, I decline to do so here. There is no showing that the letter is newly discovered by them, or even if it were, that this scrap of proof outweighs the evidence upon which they must have relied in making the judicial admission of "no borax."

To sum up, Oldsmobile's experience shows it was commercially practicable throughout the life of the Henricks patent to cold form bumpers without utilizing the Claim 4 process.

(b) Chevrolet Bumpers

(i) Chevrolet's Use of the Patented Process

While Oldsmobile shows defendant's ability to cold form bumpers without the Henricks process, the experience at its other divisions shows the development of a strong leaning to the patented technique.

At Chevrolet bumpers were hot forged until 1954 (APTO, CL:3). Under date of January 14, 1953, the Chevrolet Division submitted an Appropriation Request (PX A-130) for about $40,000,000, which was later revised upward to $46,621,000 on December 10, 1954 to construct and completely equip a new plant in Livonia, Michigan, capable of producing "90 per cent of Chevrolet's overall requirements of Passenger front and rear bumpers . . . of the types designed for 1955 Model production," to produce "Commercial (½, ¾ and 1 ton) bumpers" and to produce "springs" (PX A-130, p. 2).

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* "Plaintiffs do not accuse any of the lubricants stated in paragraph 4 above [including that of Non-Accused Practice KK] in the cold forming of bumpers. . . ." (APTO, O:12).

Among other reasons, this new plant was needed, because:

> "Design changes for 1955 passenger car bumpers . . . necessitate new processes and methods which obsolete the major portion of the existing fabricating, processing and plating equipment." (PX A-130, p. 7).

Furthermore, for 1955 there was "a radical change in the design of bumpers" to make them "an integral part of the overall car from an appearance standpoint." The Appropriation Request explained that these new designs could not be economically made by hot forging:

> "Due to the intricate curvatures of the proposed 1955 model car bumpers, it will be necessary to form the metal by the 'cold drawing' method in order to eliminate wrinkles and surface irregularities which would require excessive polishing after forming rather than by the present so-called 'hot forming' method." (PX A-130, p. 7.)

When this freshly minted plant began pumping out bumpers in 1954 the lubricant of choice was not the Henricks lubricant. Rather it was an application of plain soap (BL 215) over phosphate (Non-Accused Practice H) (APTO, CL:1, 3, 7).* The use of soap only BL 215 resulted in the satisfactory

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* Plaintiffs seek to be relieved of their pretrial stipulation to the effect that Non-Accused Practice H involved no borax. They argue that the

continued on next page

production of bumpers (Bolton, Tr. 4592-4594; Weil, Tr. 3140; Kary, Tr. 7464).

But it became apparent by 1957 and 1958, that Chevrolet-Livonia was experiencing two major problems: namely, with respect to the quality and cost of the bumpers manufactured (Kary, Tr. 7563, 7596). The plant had plating problems which were so severe that there were days at Chevrolet-Livonia in 1957-58 when bumpers could not be plated "because the quality was so bad" that the line had to be shut down and the employees sent home (Kary, Tr. 7546). A plant report for the week ended September 14, 1958, flags as unusual ". . . production problems being encountered on 1959 Model [bumper] Parts" (PX A-136).

A Chevrolet Lubricant Manual published in 1967 says that such problems may be caused by improper lubrication (PX A-126, p. 3). As I read the Manual, it recommends the use of soap and borax lubricants for severe draws (PX A-126, p. 5). This Chevrolet document was anticipated by a publication of defendant's Shop Lubrication Committee issued in December 1955 (PX A-129) and reissued in October 1959 (PX A-128) recommending a dry soap and borax film for use in severe working conditions (PX A-128 at 105-106; PX A-129 at 506-507).

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Parker specifications recommended the application of Parcolene 21 (90% borax) with the use of Bonderlube 215 over phosphated steel in cold forming (DX A-25). I decline to vacate the portion of the pretrial order dealing with Non-Accused Practice H because: (1) There is no showing that the information now relied on is newly discovered, (2) there is no showing that the inference plaintiffs seek to draw outweighs the evidence on which plaintiffs relied at the time they entered into the stipulation, *e.g.*, Kary, Tr. 7603, and (3) even if Parcolene 21 were used, its use would have been as a non-infringing neutralizer, not as a lubricant.

Departing from the usual practice of changing lubricants at the time of a model changeover (Herrmann, Tr. 4995-4997), Livonia switched in mid-November 1958 after the commencement of production of bumpers for the 1959 model from Bonderlube 215 (soap only) to Kerns 3833 (PX A-126; APTO, CL:1, 7) with full knowledge that Kerns 3833 contained borax (Kary, Tr. 7565-7566).

In the period mid-November 1958 until mid-January 1965, Chevrolet used soap and borax over phosphated steel to cold form about 93 per cent of its bumpers (PX A-285-2). Out of the 30,045,354 bumpers manufactured during this period, 27,882,018 used soap and borax, mostly Kerns 3833, with a minor use of Pennwalt's soap and borax Drawcote 1047 (PX A-285-2; APTO, CL:8). During the same period, Chevrolet avoided infringement to a limited extent by using a non-accused practice, Montgomery DA 2481 or DB 2481 (hereinafter 2481) because Oldsmobile had successfully used that product (Kary, Tr. 7465) (APTO, CL:8, 1; PX A-285-2).

The soap and borax lubricants Kerns 3833 and Drawcote 1047 (800 lbs. in 1961), as a percentage of the total lubricants used for the manufacture of Chevrolet bumpers for the period mid-November 1958 through 1964, comes out as follows (APTO, CL:8):

1958 — from mid-November — 100%
1959 — 100%
1960 — 91%
1961 — 66%
1962 — 97%
1963 — 96%
1964 — 100%

The record shows that the experience at Chevrolet-Livonia with the Montgomery 2481 had been unsatisfactory because that non-infringing lubricant created "Bonderlube impressions" (Kary, Tr. 7490-7491) requiring Chevrolet to shut down its production line every hour or so for die cleaning (Kary, Tr. 7495, 7532). After having used Montgomery 2481 for 9 per cent of its total lubricant requirements in 1960, 34 per cent in 1961, 3 per cent in 1962, and 4 per cent in 1963 (APTO, CL:8), the lack of satisfaction with the lubricant caused Chevrolet to stop using it (Kary, Tr. 7490-7491). And this despite the fact that Montgomery 2481 was lower in cost per pound and lubrication cost per bumper than the soap and borax Kerns 3833 (PX A-285-2). Price of the chemical was not the consideration at Chevrolet-Livonia in any period in choosing Kerns 3833 over Montgomery 2481 (Kary, Tr. 7503, 7503-A).

I find that Chevrolet used Kerns 3833 as its dominant lubricating system from mid-November 1958 to mid-January 1965 because it was more satisfactory to Chevrolet in its bumper forming operations than the non-infringing Montgomery 2481 which Oldsmobile had used.

In the period mid-January 1965 until the expiration of the patent in March 1969, Chevrolet used soap and TKPP, which I have found to be a borax equivalent, over phosphated steel to cold form about 84 per cent of its bumpers. Out of the 25, 487, 109 bumpers manufactured by Chevrolet during that period 21, 244, 697 used a lubricant containing TKPP (Bonderlube 200 or 200A) (PX A-282-2).

The balance were manufactured through the use of a non-accused practice, Bruce's Bruko 27 or 27B (hereinafter Bruko 27) (APTO, CL:2, 8-9; PX A-285-2). The figures break down during that period to show that Chevrolet used soap and TKPP (Bonderlube 200) as a percentage of the total lubricants used for the manufacture of bumpers, as follows:

1965 — 50% (included Kerns 3833 in January)
1966 — 89%

1967 – 100%
1968 – 100%
1969 – until expiration – 100%

(APTO, CL:8-9.)

The Bruko lubricant – not accused and unquestionably not infringing – cost only half as much per bumper as the BL 200 (soap and TKPP) lubricant with which it for a time competed for Chevrolet's favor (PX A-285-2). Cost, along with the elimination of the risk that the inclusion of TKPP would be held to read on Henricks, argued for continued usage of Bruko. Yet despite Bruko's advantages, use of BL 200 lubricant quickly came to monopolize Chevrolet's bumper making operation (APTO, CL:9). Defendant's explanation that this occurred because the Bruko salesmen were not aggressive is lame and inconsistent with the documentary evidence (DX A-25; PX A-172). I find that, as with the switch from BL 215 (soap only) to Kerns 3833 (soap and borax) beginning in 1958, the choice of BL 200 (soap and TKPP) beginning in 1965 to the ultimate exclusion of Bruko 27 (soap only) was made because Chevrolet thought BL 200 was better suited to its needs than the non-infringing alternatives.

Plaintiffs argue that except through the use of the infringing process during the infringement period, Chevrolet could not have gotten the advantages of cold forming bumpers. From this premise they urge that but for the Henricks process Chevrolet bumpers would have had to have been produced by the old and expensive hot forging method, or if they were cold formed that the sheets of steel could not have been flat polished. Polishing, plaintiffs suggest, would have had to have been done after the bumpers were shaped, a much more expensive procedure since hand work would have needed to be done to clean the contours sufficiently for electroplating. They compute the saving (pre-forming flat polishing vs. post-forming contour polishing) at $1.53 per bumper, multiply this by the 49,126,715 bumpers produced using the Henricks process from 1959-1969, and credit the Henricks process with saving Chevrolet over $75,164,000. While not relying upon savings as royalty measure for bumper manufacture, plaintiffs do point to that figure as tending to validate the $25,502,000 they seek on account of Chevrolet's infringement.

It is a fact, as I have found, that Chevrolet preferred soap and borax (and later soap and TKPP) to soap-only lubricants. And the reason was that Chevrolet thought that Henricks-type lubricants did a better job. But it is too much a leap from this to a conclusion that without using soap and borax or equivalent lubricants defendant would have had to hot pour its bumpers into molds, or to cold form them without the ability to first flat polish. Other non-infringing lubricants worked at Oldsmobile,* and likewise, as will be seen, at other divisions. I have no doubt that such lubricants could also have been made to work at Chevrolet.

What emerges from the evidence is the image of Chevrolet coming to use Henricks-type lubricants because they saw those lubricants as creating fewer problems than other lubricants. Other divisions at different times had and would come to different conclusions. It would be for the plaintiffs' negotiators to set a rate which would encourage Chevrolet to make the use of the Henricks process which it in fact did from 1957 to 1969. They would avoid grasping for a royalty level which would make Chevrolet turn to the available non-infringing alternatives. See *Foster v. American Machine & Foundry Co.* 492 F.2d 1317, 1322 fn. (2d Cir. 1974).

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* Indeed the genesis of plaintiffs' computations of savings from flat polishing stems from a 1950 article by McVey and Darsey reporting the success of the Oldsmobile (non-infringing) alternative (DX A-9, Item 1, p. 251).

(ii) The Shape of the Chevrolet Bumper Did Not Make Essential the Use of the Henricks Process.

In support of their effort to show the essentiality of the Henricks process, plaintiffs have attempted to connect a change to a borax-containing lubricant in 1958 to the need to form a more intricately shaped bumper. Plaintiffs' argument was that even if simple bumpers could be produced without Henricks, complex bumpers could not. The instrument for the effort to show that bumper shapes became more difficult to form (particularly in 1959), thereby requiring a better lubricant, was Hubert Shortt, the President of Technograph, one of plaintiffs' corporations. Without disparaging the sincerity of Mr. Shortt's opinions, I find them unacceptable.

Mr. Shortt had seen bumpers made only once, a couple of months prior to his testimony (Shortt, Tr. 2448-2449). He could not tell enough about bumpers to identify the specific construction of the Chevrolet 1958-59 front bumpers he showed in pictures accompanying his testimony (PX A-141-5 through 9). On direct examination he identified the 1959 model year front bumper as being of a massive one-piece construction and drew a cross section sketch of it (Shortt, Tr. 2273-2277; PX A-141-7A). On cross examination, Mr. Shortt again identified the 1959 Chevrolet front bumper as being of a massive one-piece construction and he again drew a cross sectional sketch of it (Shortt, Tr. 2455-2473, 2481-2482; DX A-66b). Mr. Shortt concluded from a slide show he produced that the 1959 model year bumpers were far more difficult to make than the 1958 bumpers (Tr. 2273-2274, 2474-2475), the 1959 model year front bumper was a "trouble-maker in here if there ever was one" (Tr. 2274) and that lubrication (presumably soap and borax) was required to make the part (Tr. 2275).

Robert Lawson is the master mechanic at Chevrolet-Livonia (Lawson, Tr. 3084-3085; DX A-33, tab 50). As master mechanic, Mr. Lawson is in charge of all manufacturing of bumper parts (Lawson, Tr. 3085-3086). Mr. Lawson testified that the 1958 model year front bumper was made in three pieces (Tr. 3157; DX A-66EE) and the 1959 model year front bumper was made in two pieces (Tr. 3158; DX-A-66CC). He further testified that the 1959 model year front bumper was an easier design to make than the 1958 model year, that the 1958 model year front outer wings were extremely difficult (Tr. 3160-3164) and that "I am confident that at no time were we really concerned about the lubricant as far as being able to make the part" (Tr. 3164). The lubricant used on the harder-to-make 1958 model year parts was soap only (BL 215) (APTO, CL:7).

Not only did Mr. Shortt misidentify the 1959 Chevrolet front bumper as being of a one-piece design, he included non-bumper parts (valence assemblies) as part of the one-piece bumper. Compare Shortt's sketch (DX A-66B) with the isometric view of the 1959 Chevrolet front bumper (DX A-66cc). Mr. Lawson testified that the valence assemblies were not part of the 1959 model year front bumper, were not made by Chevrolet-Livonia and were of much thinner gauge metal stock than the bumper parts (Lawson, Tr. 3158-3160).

Until confronted with an exhibit highlighting it, Mr. Shortt did not appear to know that the 1958 and 1959 model year bumpers were of a multi-piece design (Shortt, Tr. 2485). He also admitted he did not look at the engineering drawings defendant sent to plaintiffs regarding the 1959 model year front bumper parts (Shortt, Tr. 2497), which drawings would clearly have revealed that the 1959 front bumper is of a two-piece design.

Mr. Shortt's lack of expertise on the subject of the relationship between lubricant use and the intricacy of bumper design was further shown by his identification of Pontiac's 1956 model year front bumper as being a "mammoth" one-piece design, and that this one-piece design included the "Dagmars" (bomb guards) (Shortt, Tr. 2280-2281; PX A-141-14). In fact, plaintiffs' Exhibit 63 from the infringement trial shows Pontiac's 1956 model year front bumper as consisting of five parts, Nos. 521374, 521771-2, and 521794-5. Those parts are clearly labeled on plaintiffs' Exhibit 63.

I give no credit to Mr. Shortt's opinions respecting the intricacy of various bumper designs. And I reject plaintiffs' assertion that changes in bumper design made essential the use of the Henricks process.

(c) Pontiac Bumpers

From 1952 through the 1955 model year, Pontiac cold formed by Non-Accused Practice QQ using non-infringing No-Mar a portion of the bumpers it sold, and purchased the remainder from outside vendors (APTO, P:6) including Houdaille (Pinner, Tr. 1133-1134, 1130-1131).

The use of No-Mar in Non-Accused Practice QQ made it necessary to spray a plastic coating on the blanks and, in many cases, on "both sides" of the blank. The sprayed plastic was "messy" as it got on "all surrounding areas;" it produces "a messy part that the workers hate[d] to handle as it require[d] wearing of gloves as well as the protective clothing such as aprons, etc." The parts had to be washed during the process to enable welding. "Trim and pierce operations pick[ed] up a lot of slug marks during the processing because the plastic adhere[d] to the dies. Slug and fine trim ha[d] a tendency to stick to the die causing these slug marks." The entire line had to be stopped in order to clean the dies and there was no production during that time (PX A-214-1; Herrmann, Tr. 4963-4965, 4968).

At the start of the 1955 model year, a purple Mar-proof coating was sprayed over bare steel. After baking, a plastic coating was sprayed on the blank. As of November 19, 1954, at least, a decision had been tentatively reached to replace the process (PX A-214-1).

In September, October and November of 1955, Pontiac used bumper Accused Practice 48 which consisted of sending the steel for bomb type bumper guards (Parts Nos. 521424-5 to Production Finishing Co. to be precoated with Bonderlube 246 (15% borax) over phosphate, the coated steel then being returned to Pontiac where it wa coated with Molycote and cold formed (APTO, P:6-7).

Thereafter Pontiac began the prior trial practice which consisted of coating flat polished steel blanks with phosphate, then immersing them in an aqueous solution of Parcolene 21 (90% borax) coating with Bonderlube 246 and thereafter deforming the steel blanks to form bumper parts, which practice was held to be an infringement by the Third Circuit (*Id.*, P:7-11).

Except for the 1956 model year, when Pontiac continued to use non-infringing Marproof or No-Mar for a limited number of bumpers, from December 1955 to August 1963, Pontiac used soap and borax over phosphated steel for its bumpers, as follows:

Lubricant	Period of Use
Bonderlube 246 (15% borax)	December 1955-December 1958
Parker PTD 1239A (45% borax)	December 1958-March 1959
Bonderlube 249A (30% borax)	March 1959-August 1963

(APTO, P:7, 9)*

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* The BL 246 practice is the prior trial practice. The PTD 1239A and BL 249A processes are Accused (and, I have found, infringing) Practice

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Pontiac considered the Henricks process as better than the Marproof wet lubricant (Weil, App. 7:3120;** Weil, Tr. 1695-1696; Herrmann, Tr. 4989-4990). It reduced die loading, down time, scratching of the workpiece, and hand polishing (Weil, App. 7:3096-3097).

After the installation of the Henricks process, Pontiac listed some of the "advantages" of the soap and borax lubricant (Bonderlube 246) over the use of the plastic spray lubricant (PX A-214-2, dated "shortly after October 31, 1955").

> "1. The new lubricant has superior drawing qualities, therefore it reduces scoring of the dies and parts. This has reduced the amount of down time needed to remove scores from the dies.
>
> "2. It is possible with the new lubricant, which is a dry coating, to keep the dies and presses clean. This was not possible with the sticky spray compound.
>
> "3. The use of the new lubricant eliminates the five men per shift, that were needed at the presses, to apply the spray compound. This is a savings of approximately $.05 per car."

Pontiac never considered the price of the soap and borax lubricant as the reason for choosing the Henricks process over

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51 (APTO, P:2-3). Infringing Practice 51 follows on the heels of the prior trial practice, utilizes high borax lubricants, and accomplishes the same results as the practice adjudicated by the Third Circuit as infringing. Defendant's continued effort to avoid the law-of-the-case determination that this practice also infringes (Defendant's Comment on Plaintiffs' Proposed Finding 344) is noted and rejected.

** Refers to Appendix filed in Third Circuit in Infringement Trial.

non-infringing processes (Weil, Tr. 3550; Herrmann, Tr. 5098-5102, 4972). Indeed, it would appear that between 1956 and 1959, the cost per bumper of soap and borax lubrication materials at Pontiac was slightly above the cost of Bonderlube 215 at Chevrolet-Livonia, and that between 1959 and 1963 the cost per bumper of soap and borax lubrication materials at Pontiac exceeded the cost of Montgomery DA 2481 at Chevrolet-Livonia (Cf. PX A-285-1 with PX A-285-2).

Except for a limited use of the Marproof or No-Mar process or certain bumpers during the 1956 model year from December 1956 through August 1963, Pontiac used soap and borax over phosphated steel (often with an additional drawing compound or a lubricant called Molykote) for 100% of its bumper production (APTO, P:7, 9-10; Herrmann, Tr. 4977-4979, 5056). The evidence clearly shows that the reason was the superior performance of Henricks-type lubricants as compared to non-infringing substitutes.

After testing various draw compounds in 1957 including Bonderlube 215 and Montgomery DU 1101 (both without inorganic compounds), Pontiac concluded that Bonderlube 246 (15% borax) "has proven the most satisfactory" for its use (PX A-287; Herrmann, Tr. 5017-5018, 5024; DX A-28-2).

After Pontiac tested Montgomery 2481, it continued to use Bonderlube 249A (APTO, P:9; Herrmann, Tr. 5015). Lubricity was an important consideration in choosing the coating material. One material tested was not slipping out from under the pressure pads and it would cause a break in the metal (Herrmann, Tr. 5017-5018).*

It was Pontiac's general experience that there are differences in the draw characteristics of different draw compounds. "[Y]ou cannot put in a change of dies to accommodate the coatings . . ." At the start of the model year it must be decided which lubricant will be used for a given model, because "you can't run a set of dies on a trial . . . so once you start on a coating you are . . . stuck with it . . . [f]or the duration of the model [year]" unless there exists a very similar substitute (Herrmann, Tr. 4996-4997).

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* The Henricks coating was not causing breakage. It was the steel and Pontiac's Lab so reported (Herrmann, Tr. 5072-5073).

Between August 1968 to August 1969, Production Finishing used Non-Accused Practice PP (Bruce's Bruko 27B soap-only over phosphate) to precoat steel furnished by Great Lakes for Pontiac (APTO, P:15). Jones and Laughlin also furnished precoated steel to Pontiac using Bonderlube 243 over phosphate during the 1969 model year in Non-Accused Process OO (APTO, P:4, 12-13).

In summary (except for limited parts made by a non-infringing practice during the balance of the 1956 model year), Pontiac used the Henricks process as its lubricating system for 100% of its bumpers manufactured from December 1955 through the 1968 model year (APTO, P:2-4). The fair inference is that Pontiac found the Henricks process was satisfactory for its bumper manufacturing operating during that period, and was superior for its purposes to the existing non-infringing practices.* I find that to be the fact.

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* But not indispensable. Plaintiffs press for a finding that Pontiac could not manufacture its bumper bomb guards called "Dagmars" without the Henricks process. The evidence plaintiffs rely on is a report concerning the Pontiac bumper bomb guard called "Dagmars" which involved an extremely severe draw, and in which Parker Rust Proof's field man, Mr. Stump, reported that:

> "He [GM Engineer E. Waleryck] told me they [GM] can't do this job without Bonderite & Bonderlube & it is being laid out that way." (PX 86; Vol. 2:86).

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As with Chevrolet, plaintiffs argue that but for Pontiac's use of the Henricks process Pontiac bumpers would have required formation by hot forging or, if cold formed, could not have been flat-polished. I disagree.

While Pontiac felt the Henricks process did a better job than any non-infringing alternative, it does not follow that without Henricks Pontiac would have found itself unable to cold form bumpers, flat-polishing the blank sheet prior to deformation. Henricks' lubricants came to be regarded by Pontiac as more satisfactory, but others would have done the job. On this point it is topical to advert to the testimony of William L. Herrmann. Mr. Herrmann was a senior process engineer at Pontiac, responsible for flat polishing and coating of bumpers (Herrmann, Tr. 4954-4955). He was a credible witness. Mr. Herrman explained that Pontiac was aware of the Oldsmobile and Chevrolet processes, but decided to try to get better results than they had (Herrmann, Tr. 4989). Its experiments resulted in the switch to BL 246 (soap and borax). Mr. Herrmann summed it up this way;

> "The conclusion that we [at Pontiac] reached was in general that they [other lubricants] were not satisfactory for our use, but it didn't mean that we couldn't have used them, but it did mean that with our equipment, with our type of steel, with our ap-

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The writing is double hearsay, neither Mr. Stump nor Mr. Waleryck being available to explain whether the "Bonderlube" referred to was of a type with or without borax or why the lubricant (whatever its content) was especially needed. I will not infer from this fragment of evidence in the shape of a report from one Parker employee to another respecting a customer's planned product use, that General Motors could not make "Dagmars" except by the use of the Henricks process.

> plication, . . . and with our dies as they were, the [BL] 246 was the best material for our use." (Herrmann, Tr. 4989-4990.)

Pontiac liked the Henricks process. It was the first lubricant Pontiac used when it abandoned the messy Marproof lubrication. Pontiac held fast to it after the patent was validated, although substituting for what had been the borax inorganic what I have found to be a TKPP equivalent. Pontiac did not switch out of Henricks until 1968, near the end of the patent's term. And when it did so by the adoption of Non-Accused Practice OO (APTO, P:4), it came to use the Jones and Laughlin Surfa-Glaze steel with special qualities for bumper making. Negotiators for defendant seeking a license would have foreseen the strong preference by Pontiac's production people for the Henricks process. And reasonable negotiators for the patentee would have wanted to come to a royalty rate which would encourage Pontiac to use the process rather than switching over to a non-infringing alternative.

(d) Cadillac Bumpers

From 1952 through the 1958 model year, Cadillac cold formed the outer face bumper parts, only, from steel sheets without flat polishing (APTO, CAD:2). A wet lube was applied to the bare steel at the press; after forming, the parts were cleaned and then polished as necessary (APTO, CAD:2).

During the 1961 model year Cadillac cold formed all of its outer face bumper bars using Non-Accused Practice F, *i.e.*, a wet pigmented drawing compound over bare cold rolled steel; after forming, the parts were cleaned and then polished as necessary (APTO, CAD:3-2).

Before switching to the Henricks process "Cadillac was looking for a perfect finish over the entire bumper" and for that reason most of its operations "were not automated" but were, unlike anybody else's at the time, "all hand operations" (Sukes, Tr. 2998).

Cadillac switched to the Henricks process in the 1962 model year and utilized it through the 1968 model year (APTO, CAD: 2-5). Thereafter Henricks contributed to benefits in the form of better appearance (Sukes, Tr. 2996-2997), less spot polishing (Priebe, Tr. 3007, 3010), more satisfactory plating (Sukes, Tr. 3001), less rejects (Priebe, Tr. 3007-3008; Sukes, Tr. 3002), and a generally less messy and cleaner production line (Priebe, Tr. 3006; Sukes Tr. 2997, 3000).

From about July-August 1968 onward, Cadillac used Non-Accused Practices C and D consisting of J&L and Great Lakes precoated phosphate and soap-only steel (APTO, CAD:1).

Since Cadillac used the Henricks process as its lubricating system for 100 percent of its bumpers manufactured from the 1962 model year through the 1968 model year (except for limited parts made by a non-infringing practice during that period) (APTO. CAD:3-7), the fair inference is that the Henricks process was more satisfactory for Cadillac's bumper manufacturing operation during that period than non-infringing alternatives.

As with Chevrolet and Pontiac, plaintiffs urge that Cadillac bumpers could not have been flat polished and cold formed without the Henricks process. For reasons previously stated I disagree, and believe that the negotiators would view Cadillac as they would view Chevrolet and Pontiac. The Henricks process was preferred from the 1962 model year to 1968. It did the job, and Cadillac was pleased with it. The negotiators would, therefore, have approached the royalty bargaining with Cadillac willing to pay for the privilege of using the Henricks process, and the patentee seeking a rate which would encourage Cadillac to do so.

(e) Fisher Body — Elyria Bumper Parts

Boiling down the information at APTO, FB:1-5, it appears that from at least 1952, Fisher Body Division — Elyria was cold forming flat-polished steel using Bruko D-9 or Kerns DF 4800 (soap and 68 percent borax, PX A-2a) over bare steel. In 1954 Fisher Body — Elyria added the step of flat polishing the steel before applying the lubricant. The processes used from 1952 to April, 1957 are not accused.

Infringing Practice 36 ran from April 1957 through March 1960. It infringed because it added to the cold forming operation a dip in a borax-containing lubricant. On March 31, 1960, Fisher Body — Elyria discontinued using a phosphate coating and applied the soap and borax lubricant to the flat-polished bare steel. Sometime after November 1962 Fisher Body — Elyria discontinued the use of flat polishing and the use of soap and borax dry film lubricant. Since that time Fisher has applied wet lubricants over bare unpolished steel before cold forming the bumper parts it makes.

Unlike the experience at Chevrolet, Pontiac and Cadillac, where there was evidence of either problem-solving or tangible advantage coincident with the adoption of the Henricks process, the record is vacant as to specific benefits achieved during Fisher Body — Elyria's relatively short use of it. Nevertheless I infer that for the period April 1957 through March 1960 the Henricks process was used because it was thought advantageous. This is the logical, if not the only, inference, absent any evidence from defendant to the contrary.

3. The Usefulness of the Henricks Process in the Making of Non-Bumper Extruded Parts

As with bumpers, plaintiffs argue that but for Henricks, non-bumper parts could not have been extruded. But instead of computing the sales of those parts produced by Henricks, and applying to the sales figure a per cent royalty, they use as their "royalty base" the savings and gains which they attribute to Henricks when compared with the cost of cold forming or machining the same non-bumper parts.

The risk in plaintiffs' approach has been earlier noted. For bumpers plaintiffs applied a proposed royalty percentage to dollar sales. This permitted a fall-back to a lower percentage if plaintiffs' main submission (that cold forming could only be accomplished by Henricks) were rejected. But for non-bumper parts, no back-up position was supplied. Plaintiffs elected to put all their eggs in one basket, at the bottom of which is the premise that defendant's choice was between cold forming non-bumper parts through Henricks, or not cold forming at all. By computing their royalty claim on a percentage of savings and gains solely on the premise that cold forming could not be accomplished without Henricks, with the failure of the premise the bottom drops out of their savings and gains claim. And there is no secondary position justified by the evidence.

Where the royalty is based upon sales, the "essentiality" of the Henricks process becomes a factor which influences the amount of the royalty percentage, rather than being a *sine qua non* to any royalty award. If the negotiators found that the royalty of 2.4 percent of bumper sales sought by the patentee was too high because the Henricks process was not essential, they could (and would) still take into account the other merits of the patent and its value to the defendant in arriving at a compromise percentage figure. *Cf., Randolph Laboratories v. Specialties Development Corp.*, 213 F.2d 873 (3d Cir. 1954). But that choice is not available where the only proofs relate to savings and gains which themselves would be non-existent if their premise is found to be false.

And false it is. For I find the fact to be that non-bumper parts could be and very often were, cold formed by defendant without the use of Henricks. Indeed the question does not even seem to me to be a close one. The evidence is that, far from dominating the field, the Henricks process had relatively slight importance to defendant in the production of non-bumper extruded parts.

The Henricks process developed an allegiance in bumper making which it was never to find in extruded parts. Once used to form bumpers, the divisions employing it were reluctant to switch. Thus, there emerged a detectable pattern at the major infringing divisions (Chevrolet, Pontiac and Cadillac) of the use of borax in bumper production until validity was determined, and then of TKPP, for long periods without substantial change.

However, the experience of these divisions in the production of extruded parts is much more of a mixed bag.

(a) Chevrolet — Bay City

Infringing Practice 7 was used from May 1962 through July 1966 for the forming of steering knuckle and other parts by the use still received from suppliers pre-coated with BL 235 (the prior trial lubricant) or BL 239 over phosphate (APTO, CBC:1). The selfsame parts were thereafter made by Non-Infringing Practice 8 which used neither borax nor a borax equivalent. (See pages 55-56, *supra*; also, Non-Accused Practice E, APTO, CBC:1, 8). There is nothing to show that the changeover was other than routine, or that the non-infringing alternatives could not have been used from the beginning.

(b) Chevrolet — Buffalo

Infringing Practice 9 ran from July 1959 to July 1962 at Chevrolet's Buffalo plant. It involved the forming of Pitman arm ball stud seats from blanks furnished by Republic Steel and precoated by that manufacturer with BL 235 (the prior trial borax lubricant) or BL 239 over phosphate (APTO, CD:1-3). The use of the lubricant was limited in time and isolated.

(c) Chevrolet — Parma

Infringing Practice 16 (APTO, CP:1) saw the making of shafts and levers at Chevrolet's Parma plant with the help of a borax-containing lubricant from July 1963 through March 1969. While that is a durable use of Henricks, Chevrolet — Parma's movement from Infringing Practice 17 to Non-Infringing Practice 18, to Non-Accused Practices K and L (*Ibid.*) runs counter to claims of high value for the patent in non-bumper extrusions. Infringing Practice 17 involved the use of a borax-containing lubricant from 1957 — May 1963 to make universal joint bearing races and propeller shaft ends. Next came Non-Infringing Practice 18 from May 1963 through May 1964, whereby the borax lubricant was abandoned in favor of a soap-only lubricant with a borax neutralizing rinse. Then from May 1964 through October 1968 the borax neutralizer was eliminated from the rinse (Non-Accused Practices K and L). So, while the stability of the use of the Henricks process in Infringing Practice 16 suggests that the borax lubricant was favored, the apparent ease of shifting from an infringing practice to non-infringing practices suggests the opposite.

(d) Delco Electronics

Although Infringing Practice 22 is next numerically, chronologically it was the first of the accused practices. It involved the use of a borax lubricant to make rocket fuse housings and booster cups from August 1952 to February 1954 at Delco Electronics (APTO, DE:1). Except for this instance, there is no charge that Delco Electronics utilized the Henricks process for cold forming. One cannot deduce from Infringing Practice 22 a passion for the Henricks process.

(e) Delco Products

The only process accused at defendant's Delco Products Division is (partly) Infringing Practice 25. It saw the formation of studs and rings from July 1962 — July 1966 with the help of a borax lubricant (APTO, DP:1). The identical parts were made thereafter without the introduction of borax (Non-Accused Practices T and U) (APTO, DP:1, 2). Again the restricted use of the Henricks process at Delco Products, and the evident ease of moving out of it, counter-indicate a high degree of need for the process.

(f) Delco Remy

The division making the most extensive use of the Henricks process was Delco Remy. Infringing Practices 26, 27, 28, 30, and 31 — five of the total of 17 non-bumper processes required to be held infringing by the law of the case — occurred there (APTO, DR:1-2). Yet even Delco Remy seemed to have no trouble moving in and out of borax-containing lubricants. By Non-Accused Practices W, X, Y, and Z (APTO, DR:2-3), the selfsame parts produced by the infringing processes were made without the use of Henricks lubricants.

(g) Diesel Equipment

The only infringing practice at defendant's Diesel Equipment Division is the prior trial practice of making hydraulic valve lifter plungers from 1955 — third quarter of 1958. It is an isolated use (APTO, DE:1).

(h) Fisher Body-Columbus

At Fisher Body-Columbus, Non-Infringing (because cleaning advantage was not used or shown) Practice 33 was used to make window regulator bearing studs and door lock striker pins from 1963 — January 1964. Thereafter some parts were produced by Non-Infringing Practices 34 and 35 (using borax as a neutralizing rinse), Non-Accused Practice BB (eliminating the borax from the rinse), and Non-Accused Practice CC (lime coated steel) (APTO, FBC:1-8). There was no infringing use by this division.

(i) Inland Division

Infringing Practices 37 and 38 at the Inland Division were used to make ball joint sockets from 1959 – 1966 (APTO, ID:1). Thereafter a soap-only lubricant in Non-Accused Practice EE supplanted the soap and borax used in the infringing practices.

(j) Oldsmobile

Infringing Practice 42 saw the production at Oldsmobile of rocket cones called ogives, and rocket body parts, with the help of a borax lubricant from June 1953 – January 1954 (APTO, O:1). Before this non-borax lubricants were used (Non-Accused Practices II and JJ) (APTO, D:2). Like Delco Electronic's wartime use of Infringing Practice 22, Oldsmobile's short use of the Henricks lubricant does not prove much about its worth.

(k) Pontiac

Pontiac was also in the rocket-making business, using the prior trial BL 235 infringing practice in 1952 and 1953 to make rocket bodies and heads (APTO, P:1). Infringing Practice 47 was the 1954 successor to the prior trial infringing process. These were the only non-bumper practices held to infringe at Pontiac, and their use was of limited duration.

(l) Saginaw Steering

Finally, Saginaw Steering Gear, in Infringing Practices 54 and 56, did use borax-containing lubricants (PX A-2a) to produce various parts (APTO, SSG:1). Infringing Practice 54, used to make ball joint studs until March 1967, was abandoned in favor of Non-Infringing Practice 55 (borax neutralizer) (APTO, SSG:1). While Infringing Practice 54 was being used, a large fraction of Saginaw's ball joint studs were produced, without apparent difficulty, by Non-Accused Practice RR (APTO, SSG:3 and 27, fn.). Infringing Practice 56 was used to make multiple parts, mostly from 1958 – 1962, many of which were later made by Non-Infringing Practice 57 (borax neutralizer).

* * *

Any but the most fervent advocate would conclude from reviewing the pattern of defendant's non-bumper infringements that Henricks was not the only way it could, and did, cold form parts.

As in other areas of damage law it is of course the case that where a reasonable royalty cannot be precisely proved a fair approximation based on the evidence will suffice. *Faulkner v. Gibbs*, 199 F.2d 635, 639-40 (9th Cir. 1952). However, the proof must be based upon creditable data, not speculation, conjecture or unwarranted assumptions. *Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 533 F.2d 126, 130 (3d Cir. 1976); *Rude v. Wescott*, 130 U.S. 152, 166-167 (1889); *Boesch v. Graff*, 133 U.S. 697, 706 (1890); *Panduit Corp. v. Stahlin Bros. Fibre Works*, 575 F.2d 1152-1162 (6th Cir. 1978). As stated by the Supreme Court in *Rude v. Wescott, supra*, 132 U.S. at 167:

> " . . . [N]o evidence of the value of the invention to the defendants was adduced except the conjectured estimates stated; they furnished no satisfactory basis for any damages, much less data, which authorized the specific finding made as to the damages for each drill used. Opinions not founded on knowledge

> were of no value. Conclusions from such opinions were at best mere guesses. By the decision rendered, a settled rule of law was violated, that actual, not speculative damages, must be shown; and by clear and definite proof, to warrant a recovery for the infringement of a patent . . . "

By relying in their savings-and-gains proof solely on the (erroneous, as I have found) premise that defendant could have cold formed non-bumper parts only through Henricks, plaintiffs have offered no evidence on which a royalty might be reasonably based.

In so concluding I should straight-out say that I am acutely mindful that in a case of this duration every effort should be made to find a way to allow a patentee fair compensation for infringements it has fought so hard to sustain. And I should indicate that in other circumstances I would be left with a sense of malaise at finding no basis in the evidence to sustain an award for non-bumper infringements. But such uneasiness as I might otherwise have felt on the point is softened by the conviction that the usefulness of Henricks in the production of non-bumper parts was relatively minor, and by the decision to give some degree of consideration (albeit not in a quantified way) to the non-bumper infringements in the course of the hypothetical negotiations which come later.*

4. Defendant Used Borax and TKPP in Bumper-Making to Improve the Lubricant, Not Because Those Substances Cost Less than Soap.

Although what is covered here could have been, and to some degree was, discussed in the context of the usefulness of

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* See page 139, *infra*.

Henricks in bumper making, it is made the subject of a separate section to avoid submerging an important issue toward which the parties have directed special attention. The controversy comes about the the following way.

To undercut the value to be accorded by the negotiators to the usefulness of the Henricks process in bumper manufacture, defendant suggests that borax was inserted in its bumper lubricants because borax cost less than soap. It will be remembered that in making non-bumper parts, the amount of borax used by defendant in the lubricant was quite small, and that defendant has from the beginning argued that the borax was inserted as a neutralizer only. Although under the law of the case such lubricants nevertheless infringe, the relatively slight usefulness of the Henricks process in the extrusion of non-bumper parts, and plaintiffs' inability to prove damages as the result of those infringements, do tend to support the notion that the borax in low-borax lubricants was of only small significance in the lubricating process.

But the opposite reasoning applies to bumpers. There relatively large amounts of borax, and later TKPP, were used along with soap to form the lubricant. That being the case, common sense requires the inference, absent a better alternative explanation, that the very purpose of the borax and TKPP was to improve the lubricant. Not insensitive to this problem, defendant seeks to explain the use of large amounts of borax and TKPP in bumper manufacture by suggesting that these inorganics were inserted in the bumper lubricants because they were cheaper than soap. That position is contrary to the evidence, and I reject it.

The only witness defendant was able to find to testify that a switch to a borax-containing lubricant (Kerns 3833) from soap only (BL 215) was made for reasons of cost savings was John J. Kary (Kary, Tr. 7461-7464, 7490). Kary mitigated his testimony on cross examination (Kary, Tr. 7597-7598). But to the extent this testimony supports defendant's argument that Chevrolet switched from soap to soap and borax because the latter was cheaper,* I explicitly reject that testimony.

First, witness after witness testified that cost was not significant in selecting a lubricant (Weil, Tr. 3550; Herrmann, Tr. 5098-5103, 4972; Wojtowicz, Tr. 5711-5714; Kary, Tr. 7503-A). There is sense to this, because the lubricant cost is a relatively infinitesimal factor in bumper production. For example the cost of lubricant for annually producing tens of millions of dollars worth of bumpers at Chevrolet was in the neighborhood of $24,000 per year (Kary, Tr. 7598).

Second, Chevrolet never ran any cost studies to determine lubricant costs per bumper (Kary, Tr. 7490) and Kary was unfamiliar with the cost of lubricants used by other bumper plants (Kary, Tr. 7541-7542). If cost of the chemicals had been an important consideration, those costs at other divisions would have been considered.

Third, Mr. Kary's testimony that Chevrolet-Livonia stopped using Bruko 27 soap-only because the Bruko sales people were not aggressive and did not come around to sell the material to Chevrolet-Livonia, is inconsistent with other record evidence (Kary, Tr. 7504-7507; DX A-25), and inconsistent with the "second source" policy upon which he said he relied in earlier trying Montgomery DA 2481 (Kary, Tr. 7465). I believe, and find, that had the Bruko soapy lubricant been as satisfactory as the Bonderlube TKPP lubricant, its use would have been continued.

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* "Chevrolet was not required to go to soap and borax at all. Kary simply wanted to save part of the cost of the lubricant itself. Kary Tr. 7463-4." (Defendant's Comment to Plaintiffs' Proposed Fact Finding 231; also 267, 268).

Fourth, no witness testified that TKPP was cheaper than soap. To the contrary, there was evidence that at Chevrolet the use of TKPP-containing BL 200 was *more* costly than soap-only, or soap and borax (PX A-285-2).

Large amounts of borax and TKPP were used by defendant in its bumper manufacture. Defendant's explanation that the selection of these inorganics was to save lubricant cost is contrived. Indeed the very weakness of its explanation confirms the conclusion that Henricks lubricants were selected by defendant only because they supplied advantages in the production of bumpers.

5. Declination to Treat as Controlling in Fixing a Royalty Certain Transactions Relied on by Defendant

Defendant urges that various of plaintiffs' patent transactions indicate a ceiling for the worth of the Henricks patent. Its contentions will be considered *seriatim*.

(1) The Transfers of Interest in the Patent in 1955 and 1965

On September 10, 1955, Devex assigned the Henricks patent in suit to Messrs. McCoy and TeGrotenhuis* (DX A-1, Item 2). Defendant points out that in effect this agreement valued the patent at $100,000. It urges this a factor to be given controlling, or at least substantial, weight in fixing a royalty now.

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* TeGrotenhuis had worked as an attorney on the patent application (Tr. 4824-4825). He and McCoy were also minority stockholders in Devex (Tr. 4828-4829). He and McCoy prepared the agreement (DX A-1, Item 1). Henricks was then President of Devex and recommended the agreement (*Id.*).

Defendant further contends that plaintiffs in effect assigned a value to the validated patent in 1964, when a one-third interest in the patent (then subject to the exclusive license to Technograph) was sold to sophisticated and knowledgeable lawyers for $50,000, subject to an earlier created right in another (DX A-1, Item 33, last three pages; Tr. 8167-8169). It suggests that this supports a conclusion that the patent had no great worth, since it shows a market price for the patent overall at under $200,000 (DX A-1, Item 3, Article 3(b)).

I do not accept defendant's contention that the conduct of plaintiffs in their *inter sese* dealings respecting the patent should be given significant weight here, much less that it puts a ceiling on the royalty that can be awarded.

The order of the day in this phase of the accounting is to construct hypothetical negotiations to determine a reasonable royalty. It does not advance this endeavor to suggest that plaintiffs are, as defendant has somewhat perjoratively styled them, "patent speculators." True, the interests plaintiffs represent were not acquired with the idea of practicing the invention, but with the purpose of profitting from the business of licensing it. But nothing in the logic of the statute, or any law to which defendant has called attention, suggests that a person who buys an interest in a patent should for that reason receive less from the infringer than the far-sighted genius who conceives the invention, patents it, and then himself licenses it, or who transfers it to the "speculator" at what turns out to be a bargain price. Neither logic nor authority suggests that a "reasonable" royalty should vary depending on the identity of the patent owner or whether he paid fair value for his interest.

A look at the flip side of the argument defendant has coined tends to support this conclusion. If plaintiffs had demonstrably paid for the patent the hundreds of millions of dollars they now seek, defendant would not sanguinely allow that fact to create a "floor" below which a reasonable royalty could not descend. It would urge that what they paid was an irrelevancy, and that the true endeavor is to allow plaintiffs a fair share of the value of its wrongful use, be that amount great or trivial. That is the only sensible rule.

In so concluding, note should be taken of one very recent decision, relied on by defendant. *Ellipse Corporation v. Ford Motor Company,* 461 F.Supp. 1354, 1361-1362 (N.D. Ill. 1978). There the Court did remark at various transactions, for relatively small sums, in the stock of plaintiff-patentee. Having done so, it observed:

> "Ellipse now proposes the court enter a $55,476,843 judgment against Ford for reasonable royalty under its profit theory plus $41,401,257.90 in interest, or a total just under $97,000,000. This would be a huge windfall on the stockholders' comparatively small investment. It would be grossly unfair under the circumstances of this case to make such an award of damages, plus interest, and grossly unfair to the thousands of stockholders of Ford Motor Company who have invested millions of dollars in the production of automobiles and have contributed to the social and economic development of this nation and the world. Such an award would be inequitable and indefensible both in equity and law under all the circumstances of this case."

Without in any way meaning to disrespect the *Ellipse* Court, having commented on the size of plaintiff's claim when compared with the investment of its stockholders, the Court in no way explains how that investment is legally material to the royalty issue. To the contrary, the decision proceeds after detailed analysis to award damages measured by a reasonable royalty of $656,820.30 based on familiar standards.

In a human sense, of course, there may be a tendency toward irritation at a plaintiff which seeks amounts far in excess of what it can reasonably hope to achieve. I do not suggest that *Ellipse* vents that emotion, since the smallness-of-the-investment against the size-of-the-claim language may well have served some other purpose. But whatever purpose, it is clear that *Ellipse* did not view it as legally material to the reasonable royalty. Neither do I.

(b) The Value Put on the Patent by One of the Owners for Estate Tax Purposes

In this same vein defendant submits (Def. Br., II-K-16; Def. Proposed Finding K-10) that a comparable evaluation of the total worth of the patent ownership occurred in 1970 before knowledge of Judge Wright's decision (DX A-48a, p.3) when William McCoy, Jr., valued his father's one-ninth interest in the patent at $15,000 for Federal Estate Tax purposes (DX A-48, Orig. Ans. to Interrog. A-7c, Item 19, p. 5; DX A-48A, January 1979 amended Ans. to Interrog. A-7c). While the calculation is made more complicated, by reason of other interests, than simply multiplying 9 × $15,000, in rough terms defendant contends (and it is not disputed) that if the McCoy estate tax calculation were binding on plaintiffs it would value the patent at in the neighborhood of $150,000. Defendant seeks to limit plaintiffs to that figure.

Defendant's contention is rejected. If the transfer prices of patent interests are (as I have found in this case) not weighty, then the valuation of the fractional interest of one of the patent owners for estate tax purposes would seem even less significant in fixing a reasonable royalty.

(c) Settlements by Plaintiffs

In 1968 and after a total of nineteen lump-sum settlement agreements were negotiated for amounts ranging from

$2,500 to $250,000 (DX A-1, p.6). The settlements covered damages for past infringement, and those settlements negotiated prior to patent expiration had the effect of licensing all future usage (*e.g.*, DX A-1, Item 20 – Houdaille dismissal). Defendant seeks the benefit of those settlements. (See Def. Proposed Finding K-11.)

Defendant's argument on this point is directly contrary to the holding of the Supreme Court in *Rude v. Wescott*, 130 U.S. 152, 164 (1889). Age has not dulled the sharp reasoning of that decision. Rejecting a master's reliance on payments under threat of suit as proof of damages, the Court observed:

> " . . . It is clear that a payment of any sum in settlement of a claim for an alleged infringement cannot be taken as a standard to measure the value of the improvements patented, in determining the damage sustained by the owners of the patent in other cases of infringement. Many considerations other than the value of the improvements patented may induce the payment in such cases. The avoidance of the risk and expense of litigation will always be a potential motive for a settlement. . . . ."

Here the record is barren of details respecting the factual backdrop of the settlements on which defendant seeks to rely, or why they would be reliably indicative of the value of a reasonable royalty. Since no showing has been made as to how or why plaintiffs' rapprochement with other putative infringers should elude *Rude's* proscription, no weight will be accorded them.

(d) The Formea "License"

Next defendant urges that plaintiffs' licensing efforts and transactions further demonstrate the limited value of a license under the Henricks patent.

In the 1956-57 period, McCoy, Sr. and TeGrotenhuis offered licenses to Houdaille (TeGrotenhuis, Tr. 4864-4865), Standard Steel Spring (Tr. 4881-4882), Pennsylvania Salt (Tr. 4900-4906), and Borg Warner (DX A-37, letter of May 23, 1957). The royalty base was pounds of phosphate, and the only royalty amount stated was two cents per pound. Formea Chemical Corporation either had a license (DX A-6, Item 4; DX A-37, Item 1) at one percent per pound of phosphate (PX A-6, Item 3) or had a binding commitment for the grant of such a license (TeGrotenhuis, Tr. 4840-4849, 4869, 4877).

Relying upon these facts, defendant cites the rule that the patent transactions of the patentee, including patent licenses, license offers, sales and other transactions placing a value on the patent are appropriate considerations in determining the reasonable royalty. *Trio Process Corp. v. L. Goldstein's Sons*, 533 F.2d 126, 129 (3d Cir. 1976); *Randolph Laboratories v. Specialties Development*, 213 F.2d 873, 874-875 (3d Cir. 1954); *Minnesota Mining v. Berwick Industries*, 393 F.Supp. 1230, 1245 (M.D.Pa. 1975), *aff'd*, 532 F.2d 330 (3d Cir. 1976); *General Motors v. Dailey*, 93 F.2d 938, 940 (6th Cir. 1937). It concludes that plaintiffs' licensing efforts and lawsuit settlements in combination with the evidence of their own valuation of the patent in purchases and sales of patent interests and for tax purposes, operate to put a low ceiling on a "reasonable" royalty here (Def. Br., II-K-3 thru 12).

Again, I disagree. While it is clearly the law that an established royalty is strongly material in judicially settling on a post-infringement reasonable royalty, here the license arguably given the Formea Corporation did not create an established royalty. That company was largely owned and controlled by McCoy and TeGrotenhuis who also then owned the patent (TeGrotenhuis, Tr. 4834, 4893). The effort was to vitalize Formea by getting it into the phosphate selling business through the mechanism of sublicensing its hoped-for customers under the Henricks patent (*Id.* at 4843-4845, 4892-4893). There were no sales of phosphate, and no sublicenses (Def. Br. II-K-12; Tr. 2417). Indeed, it is not even certain that Formea ever formally obtained rights under the Henricks patent (*Id.* at 4843-4845). The reason for the lack of success in licensing was that the patented process was being openly used in the metal-working industry without regard to plaintiffs' rights (TeGrotenhuis, Tr. 4862-4863). These facts fall far short of proving an established royalty. ***Faulkner v. Gibbs,*** 199 F.2d 635, 638-639 (9th Cir. 1952).

Under such circumstances I decline to give weight to the Formea "license" as bearing on the reasonable royalty to be awarded here.

6. The Royalty Base

Based upon plaintiffs' unsuccessful feint at licensing the patented process based on pounds of phosphate sold by Formea, defendant concludes that the proper basis for measuring a reasonable royalty would be pounds of phosphate used to undercoat the lubricant. (Defendant argues for a penny or two a pound.) (See, Def. Br. II-K-32.)

For the reasons earlier stated, I decline to give any weight to plaintiffs' abortive effort to license the patent on a distress basis while it was being openly ignored by industry based upon the apparent wide belief that it was invalid. See ***Trio Process Corp. v. L. Goldstein's Sons, supra; Faulkner v. Gibbs,*** 199 F.2d 635 (9th Cir. 1952). Further, I am of the view that the application of a penny figure to pounds of phosphate would not be the approach taken by reasonable negotiators, for it bears no relationship to the value of the patented process. To the contrary, it is an arbitrary selection which might represent a bail-out effort by patent owners trying to salvage a modicum of value from a patent in disrepute, but not a rational basis on which to license a validated patent.

While not uniformly accepting their testimonial advocacy, on this issue I think plaintiffs' trial experts, George Church and Richard Whiting, have the better approach. In suggesting a reasonable royalty for bumpers, they applied a percentage to sales prices (Church, Tr. 1924-1925; Whiting, Tr. 2656-2657). For reasons which will soon appear I do not accept their percentages. However, their concept of using a percent of sales prices as a royalty base makes sense. It is not unprecedented. See, *e.g.*, *Randolph Laboratories v. Specialties Development Corp.*, *supra; Hartford National Bank & Trust Co. v. E.F. Drew & Co.*, 188 F.Supp. 353 (D. Del. 1960), *aff'd*, 290 F.2d 589 (3d Cir. 1961), *cert. den.*, 368 U.S. 825 (1961). And it gives the patentee a share of the value the use of the patent helped create.

I therefore conclude that a percent of sales price is the appropriate conceptual formulation for the determination of the reasonable royalty to which plaintiffs are entitled here.

7. The 1964 Offer to License

Stepping back for a moment, the statutory provision at 35 *U.S.C.* § 284 requires the award of damages " . . . in no event less than a reasonable royalty. . . ." And the willing-buyer/willing-seller test requires the hypothesis of negotiations such as would lead to that royalty.

In groping toward what royalty would be reasonable, the courts have uniformly indicated that weight should be given to royalty arrangements established between the patentee and third persons in respect of the invention. *Faulkner v. Gibbs*, 199 F.2d 635, 638-639 (9th Cir. 1952); *Union Carbide Corporation v. Graver Tank & Mfg. Co.*, 282 F.2d 653, 668-669 (7th Cir. 1960), *cert. den.*, 365 U.S. 812 (1961); *Marvel*

Specialty Company v. Bell Hosiery Mills, 386 F.2d 287, 290 (4th Cir. 1967), *cert. den.,* 390 U.S. 1030 (1968); *Carter Products, Inc. v. Colgate-Palmolive Company,* 214 F.Supp. 383, 393 (D. Md. 1963); *Amerace Esna Corporation v. United States,* 462 F.2d 1377, 1380 (Ct.Cl. 1972). While the reasonable royalty rate may be set at above the established royalty, as where the established royalty is artificially depressed by defendant's own ongoing infringement, *Trio Process Corp. v. L. Goldstein's Sons, Inc.,* 533 F.2d 126, 129 (3d Cir. 1976), absent such special circumstances the rate " . . . established in this industry as a reasonable royalty . . . " has been accorded great deference. *Randolph Laboratories v. Specialties Development Corp.,* 213 F.2d 873, 875 (3d Cir. 1954).

For reasons previously expressed, in fixing a royalty I have determined not to give weight to various of the transactions concerning the patent argued by defendant as setting a low ceiling. Prices contracted for interests in the patent, the McCoy estate tax valuations, settlements entered into with alleged infringers, and the early Formea arrangement were all found to be of little or no evidential use. They do not prove an established royalty, and I have found that they provide no guidance to hypothetical negotiators.

There is, however, evidence of a different cut.

Starting in November 1964, plaintiffs submitted a proposed form of license (DX A-66a), to each and every company it thought was using the teaching of the Henricks patent (Shortt, Tr. 2144, 2413-2415). The license offer provided for a royalty based on three-fourths of one per cent (.75%) of the net purchasing or sale price of the item so produced, or one per cent (1%) of manufactured cost (DX A-66(a)).

The importance of plaintiffs' offer to license is underscored by its timing. The offer was made in November 1964, and came just ten months after the validation of the patent by the declination of the United States Supreme Court to grant review. (Certiorari was denied on January 6, 1964. 375 U.S. 971.) Plaintiffs were then on top. If their offer had been universally accepted, it would have resulted in an "established royalty," the existence of which would have made the task of this accounting considerably easier.

Plaintiffs make a point of the fact that their offer was accepted by no one. Indeed it was not. But the lesson to be drawn from this is not that the offer was too low. On the contrary, the fair deduction is that the offer to license for three-fourths per cent of sales (or one per cent of manufactured cost) in 1964 was universally rejected, because the offer was higher than users of the process were willing to accept. See, *Foster v. American Machine & Foundry Co.*, 492 F.2d 1317, 1322 (2d Cir. 1974); see also, *Amerace Esna Corporation v. United States, supra*, at 1379-1381.

As offers to sell have been held helpful in ascertaining fair market value based on willing-buyer/willing-seller principles in the real estate context, so offers to license have been held relevant in ascribing value to a patent. *Pitcairn v. United States*, 547 F.2d 1108, 1118 (Ct.Cl. 1976):

> "As for the offers not translated into actual agreements, the authorities which reject such use (see the cases cited in 4 *Nichols, Eminent Domain,* (3d ed. rev. 1975), §§ 12.311[2] and 12.3113[3]) concern attempts by the condemnee to seek a *higher* award on the basis of offers made by or to him (or to utilize a third-party offer with respect to comparable property to gain a *higher* award). They do not involve an effort by the condemnor to rely on an offer made *by* the condemnee as proof of the value of the property. It is obvious that, although the inherent defects of offers made by condemnee-owners

> prevent the opposite party, the condemnor, from being bound by such offers, there is no reason why the owner himself should not be held to his own offer. In this instance, the post-1946 offers were not casual or *ad hoc* but were circulated 'fairly widely' in the industry. It is appropriate to take them into account and to give them great weight." (Footnote omitted.)

The *Pitcairn* reasoning makes good sense. The establishment of a royalty such as would bear strongly on the hypothetical negotiations requires the coming together of a willing patentee with willing users of the patented process. Plaintiffs' broadly circulated offer to license at three-fourths of one percent of sales (representing what the then willing patentee would accept after the validity of the patent had been chiseled in stone) was the first step in that process. It will be given weight here.

E. The Hypothetical Negotiations

All of the foregoing constitutes the predicate and forms the groundwork for the hypothetical negotiations which would lead to a reasonable royalty. Since the negotiators would be aware of everything that has been found legally and factually in the Infringement section and the preceding parts of the Damages section, those findings and conclusions would have conditioned the bargaining. Taking that as given, and aiming to avoid useless repetition while at the same time saying enough to illuminate the negotiating process as it is hypothesized, I find the following to be the most likely scenario by which the suppositious negotiators would play out their parts.

1. Plaintiffs' opening gambit in the negotiations would be to claim a hefty per cent of bumper sales, based on the same evidence and arguments advanced at trial.

Plaintiffs' trial experts were George Church and Richard Whiting. Both were knowledgeable, experienced lawyers with good credentials in the area of patent license agreements. They figured five per cent of sales was a fair royalty rate for original equipment bumpers (Church, Tr. 1924-1925; Whiting, Tr. 2657).

But original equipment prices would have been hard to prove since bumpers are bolted to a vehicle which carries a single price tag. Hence, plaintiffs relied on dealer replacement (after-market) prices charged by defendant.* These would tend to be higher than original equipment cost of the bumper, had that cost been ascertainable. (The dealer shelf cost of the sum of the parts on an item-by-item basis is greater than the cost of the whole car.) Since plaintiffs sought a royalty in all bumper sales, but had only dealer replacement figures, they felt obliged to adjust their royalty demand downward. Church discounted his 5 per cent suggested reasonable royalty to 2.3 per cent because the sales price figures supplied by defendant were for sales by defendant to its dealers by way of replacement parts, whereas 90 per cent of defendant's actual sales would have been on an attached-to-the-new-car basis at a much lower mark-up (Church, Tr. 1925-1926). Whiting came down from a 5 per cent start to 2.5 per cent for somewhat similar reasons (Whiting, Tr. 2659-2663). Plaintiffs' percentage claim of 2.4 per cent at trial was the in-between of these figures, and that is where plaintiffs' hypothetical bargainer would probably start (Pl. Br. pp. 85, 104).

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* In view of the difficulty of valuing the bumper as an integral part of a new vehicle, plaintiffs' approach is sensible. Defendant argues that some of the bumpers sold to dealers were sold as assemblies which included in their price items, like brackets, not produced by any accused process. Had defendant offered evidence that tended to show specific deductions properly attributable to aggregate bumper sale prices on account of non-infringing parts, such evidence would certainly have been relevant. But this was not done. As the record now stands, defendant is left with what seems to be a carp at a defect it made no effort to correct.

But both of plaintiffs' experts gave no weight to non-infringing, non-accused alternative processes such as the Oldsmobile process and the early Chevrolet process (Church, Tr. 1949-1950); Whiting, Tr. 2793-2798). Their bullishness about the high value of the accused bumper processes was based on the assumption that the accused processes infringed, and other alternatives were ineffectual (Church, Tr. 1966-1967, 2004, 2089; Whiting Tr. 2812-2816). The negotiators, however, would recognize, as I have found, that Henricks was not essential to General Motors' bumper production.

Alternatives being available, and the patentee desiring to maximize defendant's use of the process so as to gain an optimum in license revenues, the negotiators would move to the discussion of a percentage less than 2.4%.

2. Next the bargainers would consider a royalty figure of three-fourths of one percent of bumper sales. This is what the patentee unsuccessfully sought to establish as a royalty in 1964, and for reasons previously explained, the figure would importantly figure in the bargaining. (See pp. 126-130, *supra*.)

3. Assuming (as I must since it is all the evidence we have) that the bargainers would have before them only dealer-price (and not OEM) bumper sales figures, the bargainers would go through the same discounting process as did Messrs. Church and Whiting in reducing the 5 per cent royalty percentage with which they began to 2.4 per cent which they urged as fair. Supposing, as I do, that what was thought by plaintiffs to be reasonable at trial would have been reasonable at the bargaining table, plaintiffs' negotiator would have reduced

his proposed royalty of three-fourths of one per cent, which would have been applicable had new car bumper prices been available, to a proportionately lower figure to account for the higher prices of dealer replacement bumpers.

The arithmetic would go this way: Plaintiffs' trial experts opined that the use of dealer equipment prices would justify a reasonable royalty of just under half (.48) of that which would have been reasonable had OEM prices been available (2.4% divided by 5% equals .48). This same discount would have been applicable to plaintiffs' 1964 request that industry pay it a royalty of .75% of sales prices, and would have resulted in plaintiffs' offer to license defendant's use for a royalty equal to .36 percent of dealer replacement sales (.48 times .75% equals .36%). That is what plaintiffs' bargainer would seek.

4. The parties would agree that .36 per cent was too high. It is the same, taking into account the reduction for the use of defendant's dealer price figures recognized by plaintiffs' experts at trial, as the .75 per cent offer which was agreeable to no user of the process even after the patent was validated, when it might have been expected that a reasonable offer to license would have at least provoked the interest of industry. But the negotiators would find that it was bringing them closer to agreement.

5. The negotiators would next try to develop parameters within which to closely bargain. In so doing plaintiffs' bargainer would try to strike a figure at which defendant would be encouraged to use the patented process, thus maximizing the return under the license. Defendant's negotiator, for his part, would strive for a figure which would enable it to practice the invention without the pressure of reaching out for non-infringing alternatives. In a sense, then, their endeavor would have broad common ground. Gifted by imputation with knowledge of the facts as I have found them, and ignoring none of them, the negotiators would probably emphasize:

(a) On the one hand, Oldsmobile's ability to produce bumpers without apparent difficulty during the entire life of the patent without the use of the invention, and the intermittent success experienced by defendant's other divisions in doing likewise.

(b) On the other hand, the strong allegiance of Chevrolet, Pontiac and Cadillac to the patented process, and its use at Fisher Body. The negotiators would find especially persuasive the decision by defendant's bumper makers after the patent was validated to try (unsuccessfully as it turned out) to avoid the patent by using TKPP instead of borax in their lubricants, rather than soap-only or the Oldsmobile process.

6. The negotiators would conclude that although defendant could cold form bumpers without the Henricks process, use of that process did have benefits and value which was not inconsiderable, and that certain of its divisions would abandon such use only with great reluctance. While this value would be difficult to quantify, involving as it does a combination of judgmental factors, the strength of the allegiance to Henricks would cause the negotiators to strike a compromise.

7. So guided by the sweet voice of logic the negotiators would strive to fix a range of reason, less than the percentage sought by the patentee but high enough to fairly compensate it, within which to peg the royalty. In striving for the proper range the bargainers would be mindful of their own fallibility, and the delicacy of the judgments involved. Their task would have been made easier had there been a true established royalty, widely accepted and untainted by claims of invalidity or non-infringement. Their concentration would have also centered on the dollars and cents of savings and gains, had they had such information in reliable form. Lacking this, they would do the best with what they had. On that basis, and on the facts and law previously developed, I find that the bargainers would have come to parameters of .18 per cent to

.24 per cent of General Motors dealer priced bumper sales as the lower and upper limits — or the equivalent of a half to two-thirds of the .36 per cent plaintiffs offered (taking this to be the same as their .75 per cent license proposal in 1964, for reasons previously explained).

In so concluding I should indicate that Judge Maris' opinion in *Randolph Laboratories v. Specialties Development Corp.*, 213 F.2d 873 (3d Cir. 1954), has provided special guidance. As here, that case had a long history. It returned to the Court of Appeals for the last time after one of plaintiff's patents (the Minor patent) had been held invalid, and the District Court has awarded a 7 per cent royalty on sales of products produced by use of a second patented invention (the Mapes patent).

The Court of Appeals reversed the 7 per cent award because the royalty set by the court below was based on the premise that the Mapes patent was dominating, a premise found by the Court of Appeals to be erroneous. Left with no royalty rate, and a case too long pending, the Court set about to find a reasonable royalty without remand. It did so in a short and sensible way. The Court noted that the Minor patent was believed to be dominant, and did have an established royalty of 3 per cent before its invalidation. It observed that the device taught by the Mapes patent was superior to its competition, but not dominant. The Court therefore concluded "... that damages [for infringement of Mapes] based upon a royalty of 2 per cent of total sales would be fair and just ...". 213 F.2d 875.

While this case is poles apart from *Randolph Laboratories* on its facts, there are congruities. In *Randolph* there was an established royalty for a patent thought to be dominant before its invalidation. Here plaintiffs by their 1964 offer to license sought to establish a royalty for a patent which they contended was dominant. In *Randolph* the Court itself set the royalty for a related patent found to be advantageous, but not dominant, at a major fraction (2% vs. 3%) of the established royalty for the dominant patent. It did so in tune with its notions of fairness and justice. Here I have found that the Henricks process was advantageous but not dominant. And I have concluded that the range of royalties within which the hypothetical negotiators would finally bargain would be a half to two-thirds of the .36 per cent plaintiffs offered (the dealer price equivalent to their .75% offer) at a time they believed that their patent was dominant (indeed, a *sine qua non*) in bumper cold forming.

The approach taken by the bargainers in the negotiations hypothesized here (based on the facts and law earlier found) is far more detailed than was possible in *Randolph*. *Cf.*, *Georgia Pacific Corp. v. United States Plywood Corp.*, 318 F.Supp. 1116, 1120 (S.D.N.Y. 1970), *modified*, 446 F.2d 295 (2d Cir. 1971), *cert. den.*, 40 U.S. 870 (1971). But in the end *Randolph* instructs that judgment must be applied to come to a royalty figure which is fair and just where there is an inability to precisely quantify a reasonable royalty. The range of .18-.24 per cent is produced by the exercise of such judgment.

8. Having fixed on the top and bottom marks of the possible royalty, the negotiators would next decide where within those marks to hammer in their stake. In getting down to the short strokes of the bargaining, they would be set in motion toward the high of the .18-.24 per cent range, propelled in that direction by two factors.

First, the negotiators would be moved by what they would note as the persistence of defendant's bumper-making use of Henricks over many years in generally increasing proportions from modest beginnings at Chevrolet, Pontiac and Cadillac. They would regard the upward incline of defendant's appropriation as tending to prove the patent's desirability.

Second, I have no doubt that the bargainers would in real life, and will in the negotiations here hypothesized, give some consideration to the infringements in the non-bumper area for which no separate royalty would be assigned. While admittedly of far less importance to General Motors, easier to rectify, and not expressed in a way translatable into dollars and cents, the non-bumper infringements would be taken into account as a plus on the side of the patentee in settling on where in the range of reason the royalty percentage for bumpers should be fixed.

These factors, in combination, would tilt the negotiators to the top of the range of reason. I find they would select as the reasonable royalty .24 per cent of defendant's bumper sales based on dealer prices.

9. Finally, the bargainers would consider whether to include a provision for interest in the royalty arrangement.* As their clarity of vision would enable them to foresee all the uses made by defendant of the patented process, so they would not be blind to the events which would postpone the patentee's enjoyment of the bargained-for royalty for over twenty years.

Anticipating the possibility (or, as events proved, the certainty) that defendant might withhold payment of royalties earned, the bargainers would include as an integral part of the royalty arrangement a provision for interest. To strike a balance between avoiding the enrichment of defendant for wrongful withholding of amounts due, and compensating the patent holder for the loss of revenues justly owed, the negotiators would agree on a provision for defendant to pay interest (not compounded) at average annual corporate bond yields for each year in which royalties should have been but were not paid. This would roughly equal what the patentee could have earned with reasonable safety on its money had it been promptly paid. It would also approximate defendant's cost of money had it borrowed in the market rather than (in effect) from the patentee.

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* Discussion of the law applicable to the award of interest appears in the section immediately following.

10. Thus would the hypothetical negotiations conclude. Encapsulating them, the results would be a royalty of .24 per cent of defendant's dealer-sales of bumpers, with interest to the patentee to compensate for the postponed enjoyment of the pecuniary benefits of the invention. I find that to be the measure of the reasonable royalty due from defendant on account of its infringement.

F. Interest

1. Plaintiffs are Entitled to Prejudgment Interest on the Law as well as the Facts.

In the discussion just concluded I have found that plaintiffs are entitled to interest as a matter of fact. Consonant with the hypothetical negotiation concept, rational bargainers would recognize the unfairness of obliging the patentee to bear loss of use of the money to which it would otherwise have been entitled during the twenty-odd year period defendant would refuse to make payment. No other conclusion seems to me plausible but that under such circumstances the parties would have included in the royalty arrangement a provision for interest from the respective dates the licensee ought to have paid royalties to the licensor.

But it is fairly arguable that a fact finding might not foreclose the issue. For there has not been called to my attention any decision where interest running from the date of infringement was awarded because as a matter of fact it would have been bargained for in the hypothetical negotiations. I say this not to apologize for having found that to be the fact, but to recognize the possibility that a fact-finder may be without power to determine as a matter of fact (even if reasonable persons would agree that *is* the fact) that which could not be done as a matter of law. Because the impact of interest on the award is so large, the issue merits close analysis.

The circumstances under which interest is warranted by virtue of 35 *U.S.C.* § 284 is not a subject of judicial unanimity. Prior to the 1946 amendment (by which the predecessor of § 284 was changed to allow recovery of "damages" only, but not "profits") the general rule seems to have been that where damages were based upon an *established* royalty, interest ran from the date of infringement. However, where damages were based upon a *reasonable* royalty, interest ran from the date the damages were liquidated, absent "exceptional circumstances." *DuPlate Corporation v. Triplex Safety Glass Co.*, 298 U.S. 448, 459 (1936); *Swan Carburetor Co. v. Nash Motors Co.* 133 F.2d 562, 567 (4th Cir. 1943), *cert. den.*, 320 U.S. 762 (1943).

In its 1964 decision in *Afro Mfg. Co. v. Convertible Top Co.*, 327 U.S. 476 (1964), the Supreme Court indicated clearly (although by way of dictum) that by virtue of the 1946 amendment, the Congressional intent was for interest to be recoverable together with damages ". . . from the time infringement occurred . . ." Adverting to the legislative history of § 284, the Court stated:

> "By the 1946 amendment, Act of August 1, 1946, c. 726, § 1, 60 Stat 778, 35 USC (1964 ed.), §§ 67, 70, the statute was changed to approximately its present form, whereby only 'damages' are recoverable. The purpose of the change was precisely to eliminate the recovery of profits as such and allow recovery of damages only.
>
> " 'The object of the bill is to make the basis of recovery in patent-infringement suits general dam-

> ages, that is, any damages the complainant can prove, not less than a reasonable royalty, *together with interest from the time infringement occurred*, rather than profits and damages.' HR Rep. No. 1587, 79th Cong 2d Sess (1946), to accompany HR 5311, at 1-2; S Rep No. 1503, 79th Cong 2d Sess (1946), to accompany HR 5311, at 2." (Emphasis supplied; footnote omitted.) 377 U.S. at 505-506.

Although one might have thought the foregoing expression by the Supreme Court to be dispositively clear, that has not been the case. Some courts have accepted at face value the Supreme Court's pronouncement in *Aro*, and have declared the rule to be that interest awarded under § 284 runs from the date of infringement. *Marvel Specialty Co. v. Bell Hosiery Mills, Inc.* 386 F.2d 287, 290-291 (4th Cir. 1967); *W.L. Gore & Associates v. Carlisle Corp.* 198 U.S.P.Q. 353 (D.Del. 1978); *Corometrics Medical Systems, Inc. v. Berkey Bio-Engineering, Inc.*, 193 U.S.P.Q. 467, 478-479 (M.D. Cal. 1977). Other courts, however, have rejected the quoted *Aro* case as a careless dictum not controlling on the interest question. Those courts have held that the effect of the 1946 amendment was to eliminate the *DuPlate* rule (requiring interest in reasonable royalty cases to run from the date damages are liquidated unless there are "exceptional circumstances") and have declared that the matter is entirely discretionary with the trial judge. *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc.*, 446 F.2d 295, 301-302 (2d Cir. 1971); see *General Electric Company v. Sciaky Bros. Inc.*, 415 F.2d 1068, 1076-1077 (6th Cir. 1969). And some courts have continued, even after *Aro*, to apply the *DuPlate* rule. *Wahl v. Carrier Manufacturing Co., Inc.*, 511 F.2d 209, 214-215 (7th Cir. 1975); *Ellipse Corp. v. Ford Motor Co.*, 461 F.Supp. 1354 (N.D. Ill. 1978); *cf.*, *H.K. Porter Co., Inc. v. Goodyear Tire & Rubber Co.*, 536 F.2d 1115, 1124 (6th Cir. 1976).

Of the cases which have regarded an interest award as discretionary, the rationales for the exercise of discretion have been non-uniform and difficult to reconcile. For example, Courts which follow the *DuPlate* rule appear to equate the "exceptional circumstances" under which pre-judgment interest is allowed, with bad faith or wilful conduct such as would justify awarding attorneys' fees or multiple damages. *Ellipse Corp. v. Ford Motor Co., supra*; *Carter Products, Inc. v. Colgate-Palmolive Co.* 214 F.Supp.383 (D. Md. 1963); *cf.*, *H.K. Porter Co., Inc. v. Goodyear Tire & Rubber Co., supra*, (upholding interest award running from date of Master's report in non-wilful infringement case).

Other cases, however, are not so restrictive. In *Tights v. Kayser-Roth Corp.*, 442 F.Supp. 159, 166 (M.D.N.C. 1977), interest was awarded as of the date of infringement where the defendant, although not found to have acted in bad faith,* had infringed with full knowledge of the existence and scope of the patent. The Court concluded that the compensatory purpose of § 284 would not be served unless plaintiff could be placed in the position he would have been in had the defendant paid a reasonable royalty at the time defendant unlawfully used the plaintiff's invention. And in *Abbott v. Barretine Mfg. Co.*, 160 U.S.P.Q. 524, 527 (N.D. Miss. 1968) the Court, without finding justification for multiple damages or attorneys' fees, awarded interest "from the date [damages] would have been received by plaintiffs, but not prior to the date suit therefor was instituted by plaintiff corporation . . . ."**

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* The Court made no ruling in the Opinion as to whether multiple damages or attorneys' fees should be awarded.

** The significance of the date of the filing of suit is not clear from the opinion.

In the instant case it is unnecessary for me to decide which of the many competing rules is the correct one. For this question is controlled, at least in this District, by *W.L. Gore & Associates v. Carlisle Corp.*, 198 U.S.P.Q. 353, 371 (D. Del. 1978), where Judge Wright held:

> ". . . the law now seems to favor the assessment of compensatory interest on reasonable royalty awards, where necessary to make whole an injured patentee . . ."
>
> * * *
>
> "The reasonable royalty is an approximation . . . [of] the actual royalty which would have been paid had infringer negotiated with Patentee. The clear rule has been that moratory interest on actual royalties illegally withheld is appropriate. *Marvel Specialty Co., supra*, 236 F.2d 287, 290; *Carter Products, Inc. v. Colgate-Palmolive Co.*, 214 F.Supp. 383, 416 (D.Md. 1963). In the contemplation of the law, an infringer is on notice that a periodic payment is expected for his use of the patent. Patentee reasonably may expect to have the use of that money."

But even had *Gore* never been decided, and even were the slate clean for me to write freshly upon, I would rule both as a matter of law and of discretion that interest should run from the date of infringement without regard to whether defendant's behavior warranted multiple damages or attorneys' fees. Any other result would frustrate the compensatory purpose of § 284 and would be inconsistent with the result in other legal settings which are virtually indistinguishable.

First, if there had been an actual license providing for royalties which General Motors had breached, interest on a claim for unpaid royalties would run from the date the royalties should have been paid. *Gridiron Steel Co. v. Jones & Laughlin Steel Corp.*, 361 F.2d 791 (6th Cir. 1966). And had there been an established royalty, the result would have been the same. *Swan Carburetor Co. v. Nash Motors Co.*, *supra*, and cases cited therein. The purpose of §284 is to compensate the patentee for the royalty to which it would have been entitled, absent the infringement, *i.e.*, to put the patentee in at least as good a position as where there was established royalty. To deny a patentee prejudgment interest puts it in a worse position than patentees receiving actual, or established royalties, for no discernible reason. Such apparent arbitrariness of treatment is unfair and makes no sense.

Second, a rule which would deny prejudgment interest is at odds with the treatment of patentees under the analogous area of the law governed by 28 *U.S.C.* § 1498. Section 1498 is a "condemnation" statute designed to compensate patentees in cases where the United States uses or manufactures the invention "without license . . . or lawful right . . ." In such cases, the patentee is entitled to sue the United States in the Court of Claims to recover his "*reasonable and entire compensation* for such use and manufacture . . ." (emphasis added). Section 1498 is very similar to Section 284, which instead of using the language "reasonable and entire compensation," provides for "*damages adequate to compensate for the infringement*, but in no event less than a reasonable royalty . . . together with interest . . ." (emphasis added). Although Section 1498 does not explicitly provide for interest, it has long been judicially recognized that interest should be allowed to make the compensation "entire." *Waite v. United States*, 282 U.S. 508, 509 (1931).

Although Section 1498 (like Section 284) does not speak to the question of when interest begins to run, Section 1498 has been judicially construed to allow "delay compensation" from the date of infringement until the date of judgment. *Pitcairn* *v. United States, supra*, 547 F.2d at 1120; *Tektronix Inc. v. United States*, 575 F.2d 832, 836-837 (Ct. Cl. 1978). The "delay compensation" has been thought to flow from the statutory mandate that the plaintiff receive "entire and reasonable compensation." *Pitcairn, supra*.

But I do not understand Section 284 to have any different purpose from Section 1498, as far as interest is concerned. In *Hartford National Bank & Trust Co. v. E.F. Drew & Co.*, 188 F.Supp. 347, 349 (D. Del. 1960), *aff'd* 290 F.2d 589 (3d Cir. 1961), *cert. den.*, 368 U.S. 825 (1961), Judge Leahy had the following to say regarding the purpose of interest under § 284:

> "The award of interest, here, is, however, not a punitive device. Allowed interest in this case represents damages for *delay in* payment and *compensation* for use of plaintiff's money that should have been included in withheld annual royalty statements which, of course, were never rendered by the infringer. In short, it is moratory interest and not contract or punitive interest." (Emphasis added; footnote omitted.)

I discern nothing in the cases which suggests why the treatment of delay compensation under Section 284 should be different from its treatment under Section 1498. The two statutes have the same purpose and it would take a sophistic semanticist to detect a difference in their substance. If there is a statutory reason why a plaintiff whose patent is infringed by the United States Government should have interest where a plaintiff whose patent is infringed by a private party should not, I have yet to fathom it.

Third, the underlying premise of a "reasonable royalty" is that of a hypothetically negotiated *contract* between a willing patentee and licensee. The rule in the area of contracts is that where the contractual breach consists of a failure to pay a fixed or ascertainable monetary value (ascertainable from a standard fixed in the contract) interest is recoverable from the date payment is due. Restatement, *Contracts*, § 337; Restatement (Second) *Contracts*, § 368 (Tent. Draft No. 14, March 1, 1979). A rule allowing prejudgment interest is more consistent with the contractual rationale of a "reasonable royalty" than would be a rule disallowing such interest.

Finally, to the extent that the issue is regarded as purely discretionary, the compensatory purpose of Section 284 is not well served by a rule that would deny prejudgment interest except where the defendant has acted willfully or in bad faith. Prejudgment interest should be awardable even where, as here, the defendant acted in the good faith belief that its behavior was lawful. As stated by the Court in *Swan Carburetor Co. v. Nash Motor Co.*, *supra*, 133 F.2d at 567:

> ". . . [I]nterest in the case at bar should run from the dates when royalties should have been paid after the beginning of the accounting period. The District Judge found that the defendant made use of the Swan manifold in the bona fide belief that it was guiltless of infringement, and did not have certain knowledge that it was violating the plaintiff's rights until November 5, 1930, when the final decision in *General Motors v. Swan Carburetor Co.*, 6 Cir., 44 F.2d 24, was rendered. Hence the District Court thought that it would be equitable to calculate interest from that date, especially as the defendant prior thereto had ceased its infringement. These considerations are not without weight but in our view they should not control the decision. The defendant, having received due notice from the patent owner that it intended to insist upon its rights, deliberately continued to make use of the invention after the issue of the patent, and took the risk, now

> resolved against it by the decisions of the courts, that the patent might be declared valid. Manifestly this infringing use was a wrong from which the tort feasor should not be allowed to profit by being placed in a a better position than the manufacturers who respected the owner's rights and paid for licenses under the patent. We cannot accord to a patent infringer the privilege of using a patent, while unsuccessfully challenging its validity in the courts, and exempt him from the burden of paying the recognized price for his delay in meeting his obligations."

From the mid-1950's to now the patentee has been deprived of revenues justly due on account of defendant's appropriation. Meantime defendant, which fought hard but unsuccessfully to resist plaintiffs' claims, has had the use of monies rightfully belonging to plaintiff. To disallow interest would be to beatify that inequitable result. I have earlier found that as a matter of fact hypothetical negotiators would, foreseeing the long delay in payment, include a provision for interest as part of the reasonable royalty arrangement. I further conclude, for the reasons stated above, that both as a matter of law and as a matter of discretion, prejudgment interest should be awarded on account of the infringements as they occurred.

2. The Interest Computation

It appears to be the practice of the Court of Claims to award interest at prevailing commercial rates as the only way to provide "reasonable and entire compensation." *Pitcairn v. United States*, 547 F.2d 1108 (Ct. Cl. 1976); *Tektronix v. United States*, 552 F.2d 343 (Ct. Cl. of 1977). The Court of Claims in the above-cited cases chose the corporate bond rate as the prevailing commercial rate. Because corporate bonds are generally low risk and average yield investments, on the facts and law here, this standard seems a fair choice.*

The parties early on stipulated to the prevailing corporate bond rates (as shown in "Moody's Industrial Manuals and Moody's Bond Record Monthly as the Moody's corporate bond yield composite averages") during the period from GM's first infringement down through December 31, 1977 and "for subsequent years they shall be computed in the same manner and pro rata for part of a year" (Stipulation dated November 29, 1978). The stipulation contained these rates:

Year for which Royalties Awarded	Accumulated Simple Interest Factor to 12/31/77 (at prevailing rate)
1956	133.68
1957	128.47
1958	125.31
1959	120.66
1960	115.93
1961	111.27
1962	106.65
1963	102.15
1964	97.57
1965	92.94
1966	87.60
1967	81.78
1968	75.27
1969	67.91

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* While arguing against plaintiffs' entitlement to prejudgment interest, to the extent interest is allowable defendant does not strongly oppose the prevailing rate approach. (Oral Argument of 11/14/79 at Tr. 219-221). That approach is not new to this District. *Hartford National Bank & Trust Co. v. E.F. Drew & Co.*, 188 F.Supp. 347 (D .Del. 1960), *aff'd*, 290 F.2d 589 (3d Cir. 1961), *cert. den.*, 368 U.S. 825 (1961).

Plaintiffs' post-trial memorandum on the point showed an interest calculation on the same basis *(Moody's* corporate bond yield composite) for the calendar year 1978 of 9.07 per cent. In their pre-oral argument presentation plaintiffs submitted, with supporting excerpts from *Moody's*, that prevailing corporate bond rates would have yielded an investor an 8.15 per cent return through the first ten months of 1979. The 8.15 per cent represents five-sixths (1/1/79 - 10/31/79) of 9.775 per cent which is the average of *Moody's* corporate bond annual yield composite averages for the first nine months of 1979 as follows:

January	9.65%	June	9.81
February	9.63	July	9.69
March	9.76	August	9.74
April	9.81	September	9.93
May	9.96		

See Appendix to Volume I of plaintiffs' interest presentation, pages 2-6.

While plaintiffs' figures even now need updating, and this, when done, will eliminate the need to estimate October's rate on the basis of the prior nine months' average, defendant has neither disputed plaintiffs' numbers nor the way in which they were calculated. Hence, while the interest to which plaintiffs are entitled will need to be fine-tuned by a bring-down of the *Moody* figures to the date of final order, as the record now stands I accept plaintiffs' figure and award interest for the period January 1-October 31, 1979 at the rate of 8.15 per cent.

Thus, to the interest figures in the parties' stipulation, which had provided rates through 1977, there should be added 9.07 per cent to cover 1978, and 8.15 per cent for the first ten months of 1979. Adding 17.22 per cent to the stipulated commercial rates produces the following interest factors through October of 1979:

Years for which Royalties Awarded	Accumulated Simple Interest Factor to 10/31/79 (at prevailing rate)
1956	150.90
1957	146.69
1958	142.53
1959	137.88
1960	133.15
1961	128.49
1962	123.87
1963	119.37
1964	114.79
1965	110.16
1966	104.82
1967	99.00
1968	92.49
1969	85.13

G. Accounting

1. Introduction

From the findings made to this point, the accounting becomes an arithmetic calculation. For simplicity of understanding a division-by-division approach will be used, with a breakdown to infringing bumper practices within each division year by year. The formulation will identify sales volume for each such infringing practice, apply to those volumes the .24 per cent royalty hypothetically struck, and add interest. That being the conception, the accounting follows:

2. Chevrolet

The sales value* for the 94,523,568 bumper parts that Chevrolet produced by infringing practices (APTO, CL.10), and the reasonable royalty thereon calculated at .24%*, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
12	1958	$ 19,087,556	$ 45,810.10	142.53	$ 65,293.14	$ 111,103.24
12	1959	96,133,986	230,721.60	137.88	318,118.94	548,840.54
12	1960	98,893,537	237,344.50	133.15	316,024.20	553,368.70
12 & 13	1961	57,519,264	138,046.20	128.49	177,375.56	315,471.76
12	1962	119,068,270	285,763.80	123.87	353,975.62	639,739.42
12	1963	142,194,546	341,266.90	119.37	407,370.30	748,637.20
12	1964	134,261,986	322,228.80	114.79	369,886.44	692,115.24
12 & 14	1965	88,287,411	211,889.80	110.16	233,417.80	445,307.60
14	1966	84,485,105	202,764.30	104.82	212,537.54	415,301.84
14	1967	123,524,669	296,459.20	99.00	293,494.61	589,953.81
14	1968	129,074,863	309,779.70	92.49	286,515.24	596,294.94
14	1969	136,728,881	328,151.70	85.13	279,355.54	607,507.24
		$1,229,261,074	$2,950,226.60		$3,313,364.93	$6,263,591.53

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* Sales value, on this chart and the charts which follow it, represents the total number of bumper parts produced by infringing practices times the unit selling prices to GM dealers, even though in fact only about 10% of the bumpers produced were sold to dealers. The remainder were sold as original equipment on automobiles. As previously noted, the only selling price available for these parts is GM's selling price to its dealers. The sales value figures on the above stated premises were agreed to by the parties (APTO, CL:10).

For purposes of clarity it should be said that relatively little of the 1961 infringement stemmed from Infringing Practice 13, the use of Pennwalt Drawcote 1047 (APTO, CL:1). Most of it resulted from the use of Kerns 3833, Infringing Practice 12 *(Ibid.)*. The allocation of the $138,046.20 royalty for 1961 breaks down to $129,929.10 for Infringing Practice 12 based on the use of 12,800 pounds of lubricant Kerns 3833 (94.12% of the total lubricant) and $8,117.10 for Infringing Practice 13 based on the use of 800 pounds of lubricant Drawcote 1047 (5.88%) (APTO, CL:8).

For 1965 in the breakdown between Infringing Practices 12 and 14, $21,949 was allowed for Infringing Practice 12 based on the sales value of $9,145,410 from the use of lubricant Kerns 3833 (2,400 pounds), and $189,940.80 for Infringing Practice 14 based on the sales value of $79,142,001 from the use of lubricant Bonderlube 200 (18,980 pounds) (APTO, CL:10).

3. Pontiac

Parallel with the Chevrolet calculations, the sales value for the 22,080,159 bumper parts that Pontiac produced by infringing practices (APTO, P:18), and the reasonable royalty thereon calculated at .24%, with interest added, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
Prior Trial Prac. and 48	1956	$ 20,851,713	$ 50,044.10	150.90	$ 75,516.55	$ 125,560.65
Prior Trial Prac.	1957	38,324,037	91,977.70	146.69	134,922.09	226,899.79
Prior Trial Prac.	1958	26,563,654	63,752.80	142.53	90,866.87	154,619.67
Prior Trial Prac. and 49 and 51	1959	41,858,559	100,460.50	137.88	138,514.94	238,975.44
51	1960	48,175,964	115,622.30	133.15	153,951.09	269,573.39
51	1961	31,052,362	74,525.70	128.49	95,758.07	170,283.77
51	1962	48,488,559	116,372.50	123.87	144,150.62	260,523.12
51	1963	55,404,795	132,971.50	119.37	158,728.08	291,699.58
53	1964	75,490,002	181,176.00	114.79	207,971.93	389,147.93
52 and 53	1965	87,528,591	210,068.60	110.16	231,411.57	441,480.17
50, 52 and 53	1966	85,281,475	204,675.50	104.82	214,540.86	419,216.36
50, 52 and 53	1967	81,750,445	196,201.10	99.00	194,239.09	390,440.19
50, 52 and 53	1968	94,055,341	225,732.80	92.49	208,780.27	434,513.07
Totals		$734,825,497	$1,763,581.10		$2,049,352.03	$3,812,933.13

Again, for clarity, the breakout of the 1959 royalty figures should be shown. The reasonable royalty of $100,460.50 for that year combines $33,486.80 allocated to the prior trial infringing practices (and the related Infringing Practice 48) based on the sales value of $13,952,827 from the use of lubricant Bonderlube 246 (APTO, P:18, 9), and $66,973.70 allocated to Accused Practices 49 and 51 based on the sales value for seven months (January - July 1959) of $27,905,732 from the use of lubricants Parker PTD 1239A and Bonderlube 249A (APTO, P:18, 9). The reasonable royalty of $66,973.70 is, based on the period of use by Infringing Practices 49 (2 months - 2/7ths) and 51 (5 months - 5/7ths), prorated as follows: Infringing Practice 49, $19,135.30, and 51, $47,838.40. Infringing Practices 50, 52 and 53, all involving the use of Parker TKPP-containing lubricants, are combined for the years 1964-1968 although they were used at overlapping times during that period because no purpose is served by separating them.

4. Cadillac

Again on the same basis as the Chevrolet figures, the sales value for the 11,528,284 bumper parts that Cadillac produced by infringing practices (APTO, CAD:8), and the reasonable royalty thereon calculated at .24%, with interest added, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
4	1959	$ 6,075,278	$ 14,580.70	137.88	$ 20,103.87	$ 34,684.57
—	1960	—	—	—	—	—
5	1961	2,661,690	6,388.10	128.49	8,208.07	14,596.17
5	1962	52,238,582	125,372.60	123.87	155,290.04	280,662.64
5	1963	39,953,219	95,887.70	119.37	114,461.15	210,348.85
5 & 6	1964	43,674,508	104,818.80	114.79	120,321.50	225,140.30
6	1965	48,561,410	116,547.40	110.16	128,388.62	244,936.02
6	1966	59,610,782	143,065.90	104.82	149,961.68	293,027.58
6	1967	62,425,675	149,821.60	99.00	148,323.38	298,144.98
6	1968	68,231,343	163,755.20	92.49	151,457.18	315,212.38
Totals		$383,432,487*	$920,238.00		$996,515.49	$1,916,753.49

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* The individual items shown in the pre-trial order were added to total $383,432.587. The total appears to be $100 off the mark.

5. Fisher-Body Elyria

Finally, the sales value for the 2,905,425 bumper parts that Fisher-Body Elyria produced by infringing practices (APTO, FB:10), and the reasonable royalty thereon calculated at .24%, with interest added, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
36	1957	$ 7,856,454	$18,855.50	146.69	$ 27,659.13	$ 46,514.63
36	1958	15,160,154	36,384.40	142.53	51,858.69	88,243.09
36	1959	11,284,448	27,082.70	137.88	37,341.63	64,424.33
36	1960	6,286,467	15,087.50	135.15	20,390.76	35,478.26
Totals		$40,587,523	$97,410.10		$137,250.21	$234,660.31

6. Summary

Division	Infringing Practices	Reasonable Royalty	Interest Thru 10/31/79	Total Royalty and Interest
Chevrolet	12, 13, 14	$2,950,226.60	$3,313,364.93	$ 6,263,591.53
Pontiac	Prior Trial 48, 49, 50, 51, 52, 53	1,763,581.10	2,049,352.03	3,812,933.13
Cadillac	4, 5, 6	920,238.00	996,515.49	1,916,753.49
Fisher-Body Elyria	36	97,410.10	137,250.21	234,660.31
Grand Total of Accounting		$5,731,455.80	$6,496,482.66	$12,227,938.46

IV. CONCLUSION

The foregoing constitutes the report of the special master, submitted to the parties and filed with the Clerk as provided for at F.R.C.P. 53(e).

/s/ Bruce M. Stargatt
Special Master

Dated: February 7, 1980

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, et al.,
Plaintiffs,

v.

Civil Action
No. 3058

GENERAL MOTORS CORPORATION,
Defendant.

OPINION

August 22, 1980
Wilmington, Delaware
WRIGHT, Senior Judge

Devex Corporation ("Devex") seeks more than $100 million actual damages, plus punitive damages, interest, attorneys' fees and costs for infringement by General Motors Corporation ("G.M.") of Claim 4 of Devex's patent[1] for a process to pressure-form metal objects.

This case began in 1956-57 when Devex sued G.M. and Houdaille Industries, Inc. in the Northern District of Illinois. In 1962, Judge Edwin A. Robson ruled that Claim 4 of Devex's patent was invalid.[2] A year later, however, the Seventh Circuit Court of Appeals reversed and held that

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[1] Reissue Patent No. 24,017 issued to Devex's assignee John A. Hendricks on June 7, 1955, on Original Patent No. 2,588,234, dated March 4, 1952, based on an October 31, 1950 application.

[2] Principal Documents on Accounting, No. 2.

Claim 4 was valid.[3] The Supreme Court denied G.M.'s motion for review.[4] G.M. and Devex then moved their dispute here. Following trial, this Court found that three of G.M.'s accused practices did not infringe Claim 4,[5] a finding that the Third Circuit Court of Appeals reversed on appeal.[6]

This Court subsequently appointed a Special Master, Bruce M. Stargatt, Esquire, who worked hard, long and well to determine which of G.M.'s other accused practices infringed Claim 4 and to set a reasonable royalty that G.M. should pay for its infringement. With the Master's guidance, the parties took dozens of depositions, propounded and answered hundreds of interrogatories and produced thousands of documents. A hearing followed, consuming fifty-three days between October 30, 1978 and February 14, 1979. Following briefing and argument, the Master released his report on February 7, 1980. Presently before this Court are the parties' Exceptions to the Report of the Special Master.

THE INVOLVED PROCESS

Claim 4 covers:

> The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed there through a solid inorganic com-

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[3] Devex Corp. v. General Motors Corp., 321 F.2d 234 (7th Cir. 1962).

[4] Devex Corp. v. General Motors Corp., 375 U.S. 971 (1964).

[5] Devex Corp. v. General Motors Corp., 316 F.Supp. 1376 (D.Del. 1970).

[6] Devex Corp. v. General Motors Corp., 467 F.2d 257 (3d Cir. 1972).

> pound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

As the Master noted: "The 'organic binding material' contemplated by the patent is soap. The 'inorganic compound' is borax, or some other inorganic substance meeting the patent's claims and performing the same function as does the borax."[6]

The happy result of this process is that phosphate, soap and borax work to lubricate the pressure-forming operation, preventing harmful contact between the metal products and the machinery with which they are formed. Although other lubricants may be used, the phosphate, soap and borax combination is especially beneficial because it may be easily cleaned from the metal product following its formation.

THE MASTER'S FINDINGS

The Master first found that, from among G.M.'s approximately sixty allegedly infringing practices, practices 4-5, 7, 9, 12-13, 16-17, 22, 25 (in part), 26-28, 30-31, 36-38, 42, 47-49, 51, 54 and 56 all clearly infringed Devex's patent. In addition, the Master found that chemicals tetrapotassium pyrophosphate (TKPP) and trisodium phosphate (TSP) were borax equivalents. Thus, the Master found that the use of phosphate, TKPP and soap in accused practices 6, 14, 50 and 52 infringed Claim 4. He found that the remaining practices did not infringe Claim 4 for a variety of reasons.

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[6] Report of Special Master (hereinafter "Master's Report"), p. 7.

First, the Master held that Claim 4 included a requirement that products be cleaned following their formation. Because accused practices 2, 3, 10, 11, 15, 19-21, 25 (in part), 33-35, 39-41 and 44-45 included little or no cleaning, he found that these processes did not infringe. Second, the Master held that Claim 4 included a requirement that borax be used as a lubricant and/or as a cleaning agent. Because Devex failed to show that borax was used for either of these purposes in accused practices 1, 2, 8, 18, 20, 23-24, 29 (in part), 32, 34-35, 39, 43, 55 and 57-58, he found them to be non-infringing. Finally, the Master rejected accused practice 1 (after 1963), 8 and 46 because Devex failed to show that these processes in any way involved the use of borax or its equivalents.

The Master next assessed damages for the infringing practices. In many of these practices, including 4-6, 12-14, 36 and 48-53, G.M. manufactured bumper parts. In setting royalties for these practices, the Master first noted Devex's industry-wide offer, made soon after the Supreme Court declined to review the Seventh Circuit's determination that Claim 4 was valid, to license in return for a royalty of 0.75% of the value of the products manufactured by the use of Claim 4. Although the parties failed to present direct evidence regarding the value of G.M.'s bumpers in the mounted-on-the-car form in which they were usually sold, Devex did present evidence of the price at which G.M. sold its bumpers as parts. Devex's experts next argued, and the Master found, that bumpers on their mounted-on-the-car form should be valued at about 48% of the price at which G.M. sold them as parts. The Master, thus, calculated that the value of the approximately 130 million bumper parts formed by using the process of Claim 4 totalled about $1.15 billion. Multiplying this figure by 0.75%, the Master found that the price of Devex's 1964 offer totalled $8,607,183.70. The Master then found that through subsequent negotiations, the parties would have reduced this figure by one-third, to about $5.7 million.

The Master further found that G.M. would have agreed to pay interest at a composite corporate bond rate for the use of the royalty monies over the many years since its initial infringement.[7] Accordingly, the Master increased his assessment by about $6.5 million, arriving at a total figure of about $12.2 million, as damages for G.M.'s use of the Claim 4 process to manufacture bumpers.

G.M. also used the infringing process to manufacture other products besides bumpers. The Master, however, ruled that Devex failed to adduce sufficiently reliable evidence regarding a reasonable royalty for the manufacture of these products. Therefore, the Master found that Devex was not entitled to recover anything for G.M.'s use of the Claim 4 process to manufacture products other than bumpers.

The Master refused to award multiple damages, or attorney's fees, finding that G.M.'s infringement was insufficiently aggravated.

PLAINTIFFS' OBJECTIONS TO THE MASTER'S FINDINGS[8]

Devex first seeks to widen the scope of infringing processes to include processes in which metal was treated with

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[7] For the actual method of computation, which the Court hereby approves, *see* Master's Report, p. 153.

[8] In considering the parties' objections, the Court is particularly mindful of the presumption of validity normally attaching to a Master's factual findings. Unless such findings are shown to be clearly erroneous, they

continued on next page

phosphate, soap and borax and pressure-formed, although the process did not include any cleaning operation. Devex argues that Claim 4 does not require cleaning. Rather, Devex argues the fact that metal products may be easily cleaned following their formation was an incidental benefit. Devex further argues that the "user of a patented invention does not avoid infringement by failing to utilize all the benefits of the invention."[9]

Plaintiffs' argument misinterprets the import of the earlier decisions in this and related cases, holding that Claim 4 requires cleaning as an integral step of its process. The Court particularly notes the Seventh Circuit's July 12, 1967 decision in *Devex Corp. v. Houdaille Corp.*, 382 F.2d 14. That case is especially relevant, even though Devex and G.M. had previously moved their dispute from the Seventh Circuit, because it interprets the Seventh Circuit's 1963 decision rendered while the dispute between G.M. and Devex was still before that Court. The background to the 1967 case is that, in 1965, Judge Robson granted summary judgment in favor of Devex on the issue of infringement. The lynchpin of Judge

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must be accepted. Federal Rules of Evidence 53(e)(2); W. L. Gore & Associates, Inc. v. Carlisle Corp., 198 U.S.P.Q. 353 (D.Del. 1978). "A finding is 'clearly erroneous' when although there is evidence to support it, the reviewing court on the entire evidence is left with the definite and firm conviction that a mistake has been committed." United States v. United States Gypsum Co., 333 U.S. 364, 395 (1948). Of course, the "clearly erroneous" standard does not apply to the Master's legal conclusions which "have no effect except to the extent they are correct propositions of law." 5A J. Moore, Federal Practice ¶53.12[5] (2d Ed. 1980).

[9] Brief In Support Of Plaintiffs' Exceptions to The Special Master's Report (hereinafter "Plaintiffs' Brief"), p. 181.

Robson's decision, reported at 148 U.S.P.Q. 74, was that Claim 4 should be literally interpreted. Although Claim 4 was and is very broad, Judge Robson refused to "read into the claim a requirement" that would limit its scope. *Id.*, p. 77.

On appeal, the Seventh Circuit held that their 1963 "decision requires that the claim in suit be given a narrow and restricted construction."[10] The Seventh Circuit Panel then reviewed the setting for its prior decision:

> [I]t was conceded that all of the elements of the claim were old in the art, but plaintiffs sought to uphold validity upon the basis that such elements "were put together in a new way and achieved a new and unexpected result." It was solely on this basis that this Court sustained validity and reversed the District Court.
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> . . . .
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> Thus, having obtained a decision of validity on a narrow and restricted basis, they now contend, inconsistently we think, that the claim must be applied literally to defendant's alleged infringing process. Such a construction would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results.[11]

Clearly, then, the Seventh Circuit contemplated that Claim 4 should be afforded a more limited interpretation than its literal reading might otherwise suggest. The Third Circuit expressly recognized the applicability of the Seventh Circuit's findings, ruling that "[C]laim 4, even as restricted and held valid in the Seventh Circuit, covers and protects the combination of soap and borax . . . so that the process will yield its claimed advantages."[12]

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[10] Devex Corp. v. Houdaille Corp., 382 F.2d 17, 22 (7th Cir. 1967).

[11] *Id.*, pp. 22-23.

The Seventh Circuit contemplated that cleaning metal products would be required as an integral part of Claim 4. Devex's patent involved a combination of well-known and often-used parts. One prior art patent disclosed the use of a phosphate coating. Another patent disclosed the use of lubricants containing soap and borax and a prior art publication disclosed the use of a soap lubricant over a phosphate coating.[13]

Judge Robson's 1962 opinion recognized that a new combination of old elements may be patentable, but only if it "achieves new and surprising results, or stated differently, the whole exceeds the sum of the parts."[14] Subsequent opinions by both the Seventh and the Third Circuits repeated this test.[15] Devex's problem then was to articulate the new and surprising result of its process. To this end, Devex stressed how easily the products of its process, once formed, might be cleaned.[16] This result contrasted with the results of other processes, which, while showing an acceptably high level of lubrication, caused zinc stearate to form on and adhere to the surface of the formed product. Since zinc stearate is insoluble in water, it can be removed only through difficult, time consuming and expensive cleaning.

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[12] Devex Corp. v. General Motors Corp., 467 F.2d 257, 262-3 (1972).

[13] Principal Documents on Accounting, No. 2.

[14] *Id.*

[15] Devex Corp. v. Houdaille Industries, Inc., 382 F.2d 17, 22 (7th Cir. 1967); Devex Corp. v. General Motors Corp., 467 F.2d 257, 258 (3d Cir. 1972).

[16] Principal Documents on Accounting, No. 2A, No. 3A.

The primary importance of Devex's process was not that the addition of borax somehow enhanced lubricity. Rather, the addition of borax inhibited the formation of zinc stearate resulting in products that could be easily cleaned. Devex thus relied upon the case of cleaning to defend the validity of what would otherwise have been an overly broad claim.

Devex claims, however, that "it is clearly established that a Court may not add limitations to claims in order to make them patentable. *Graver Mfg. Co. v. Linde Co.*, 336 U.S. 271, 277 (1949)." Where Claim 4 did not literally impose a requirement of cleaning, Devex argues, courts were powerless to impose one.

Devex's reliance on *Graver Mfg. Co.* is misplaced. On reargument, the Supreme Court clearly rejected "as subordinating substance to form" the rule of literalism which Devex now seeks to resurrect. Indeed, *Graver Mfg. Co.* specified a thorough review of all available interpretative aids and a number of cases have accepted this direction. Chisum, Patents §18.04[4] (1980). *See e.g. Huntman Stabilizer Corp. v. General Motors Corp.*, 144 F.2d 963 (3d Cir. 1944). Although courts may not rewrite patent claims, they may interpret them so as to avoid a finding of invalidity.[17] Neither precedent nor logic dictate that a claim which has been narrowly construed in order to survive a validity determination should be interpreted more broadly when it comes to determining what practices violate its coverage. Accordingly, the Court accepts the Master's finding that "[p]ractices as to which little or no cleaning was required do not infringe" Claim 4.

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[17] Application of Prater, 415 F.2d 1393 (C.C.P.A. 1969); Huntman Stabilizer Corp. v. General Motors Corp., 144 F.2d 963 (3d Cir. 1944).

Devex next attacks the Master's conclusion that practices applying borax as a rinse to phosphate coated metal and then applying soap were non-infringing. The Master claimed that this conclusion was supported by several considerations, all of which must be rejected.

The Master first found that "there was not a shred of evidence that borax (or equivalent) rinses were employed for the purpose of enhancing either the lubricity of the work-piece, or its post-formation cleanability. Rather, the Master concluded "[T]he record as a whole demonstrates that the only purpose of the borax in the accused rinse processes was to neutralize acid carryover from the phosphate bath."[18] The Master also considered the beliefs of Devex, its assignor and G.M. regarding the purpose for using borax rinses.[19] The history of this litigation, however, shows the fallacy of considering the reason why Claim 4 specifies the use of borax. In an earlier opinion, this Court carefully reviewed involved chemical principles, considering the purpose for which Claim 4 required the use of borax. This Court then concluded that G.M. had not infringed Claim 4 because Devex had failed to demonstrate that GM's purpose in using borax matched the purpose for which its use was specified in Claim 4.[20] On appeal, the Third Circuit rejected this approach, ruling: "[I]f it is directly determinable that the two lubricants have essentially the same components, are applied in the same way and that the results of their use are essentially the same, the disputation of chemists about the chemical interactions that occurred in the processes cannot be decisive."[21]

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[18] Master's Report, p. 46.

[19] *Id.*, pp. 48-51.

[20] Devex Corp. v. General Motors Corp., 316 F.Supp. 1376, 1383-86 (D.De. 1970).

[21] Devex Corp. v. General Motors Corp., 467 F.2d 257, 261 (3d Cir. 1972).

In applying this test, the Court first notes the similarity between the borax rinse processes and the other processes in which borax was used as an integral part of metal forming. In both processes, phosphated metal was dipped in a borax solution,[22] treated with soap, formed, and, in some cases, cleaned with good results. To the extent that the borax rinse processes involve cleaning, then, they meet the Third Circuit's test of infringement. To the extent that these processes do not involve cleaning, they do not infringe Devex's patent, but only because they do not involve cleaning.

The Master next assumes the position that file wrapper estoppel prevents Devex from accusing the G.M. processes that involve a borax rinse. Under this doctrine, a patentee cannot later claim what the Patent Office required him to surrender in order to obtain his patent.[23] In this case, the Master found that Devex's assignor initially included an Example XXXV involving a borax rinse in his application.[24] Devex's assignor then "cancelled that example when the patent examiner required that the specification be shortened and limited to 'such parts of it as are commensurate with claims that the applicant will continue to prosecute.'"[25] The problem with this argument is that it is unclear whether the examiner's objections were aimed at Example XXXV's borax rinse or at some other procedure. Indeed, the file wrapper is silent on this issue.[26] To the extent there is any evidence on this issue it indicates that the Patent Office believed that Devex's patent covered borax rinses. Thus, the Patent Office permitted Devex's patent to issue with at least one example, Example VIII, suggesting the use of a borax rinse.

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[22] G.M. might argue that the concentration of borax in the rinse solution was usually lower than the concentration in the integral borax solutions. This rule, however, was not universal. Master's Hearing Transcript, pp. 117-125. G.M. might also argue, as the Master found, that Devex "offered no credible quantitative proof as to the amount of borax from the rinse likely retained in the coating after the lubricant bath." Master's Report, p. 45. Still, the above cited hearing testimony indicates that the borax rinse deposits were substantial. Thus, the Master "credit[ed] the testimony that at least some borax stayed on the workpiece." Master's Report, p. 45.

[23] Chisum, Patents §18.05 (1980).

[24] PX-3, p. 63.

[25] Master's Report, p. 48

Devex next attacks the Master's finding that accused practices 1 (after 1963), 8 and 46 in no way involved the use of borax and so were non-infringing. This finding, however, is based entirely upon the inferences to be drawn from the disputed evidence. The Master so meticulously reviewed and resolved this evidentiary dispute and it would be useless to repeat his discussion here.[27] Careful scrutiny of his findings, however, shows that they are not clearly erroneous; Devex failed to adduce enough evidence to give the Court a "definite and firm conviction" that the Master made a mistake. Accordingly, the Court affirms these findings.

Devex next attacks the Master's calculation of a reasonable royalty covering G.M.'s use of the Claim 4 process to make automobile bumpers. Devex claims that the Master erred in placing so much reliance upon Devex's 1964 industry-wide offer to license Claim 4 at 0.75% of the value of the products manufactured using Claim 4. Instead, Devex argues, the Master should have used the five percent of value figure suggested by its experts.

The ideal patent royalty assessment would be the rate at which a "willing buyer and a willing seller" would agree in an arms-length negotiation. *Horvath v. McCord Radiator &*

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[26] PX-3, p. 103

[27] Master's Report, pp. 53-59.

Manufacturing Co., 100 F.2d 326 (6th Cir. 1938). Devex argues that it is entitled to a high royalty rate on the basis of its contention that it was very expensive to substitute other processes for that of Claim 4.

The Master, however, reached an opposite conclusion, finding that several of G.M.'s divisions regularly substituted non-infringing processes for infringing ones and *visa versa*. Thus, Oldsmobile used non-infringing practices to make almost all of its bumpers. Similarly Chevrolet relied, though less successfully, upon non-infringing processes until November, 1958, and used non-infringing processes to manufacture part of its bumper needs from 1960 to 1963 and from 1965 to 1966. Cadillac used non-infringing processes prior to 1962 and after 1968. Fisher Body used non-infringing processes prior to 1957 and after 1960. Where G.M.'s various divisions so often produced marketable cars without using Devex's process, the Court finds, as the Master did also, that G.M.'s negotiators would not have agreed to the high figure Devex now proposes.

Devex argues, however, that the use of its process saved G.M. at least $1.53 per bumper, or a total of some $75 million at G.M.'s Chevrolet Division alone. Although a patentee should be allowed some freedom in choosing the standard of comparison by which the savings to be derived from the use of its process may be calculated, a patentee is not free to choose any standard of comparison. Rather, his standard must be acceptable.[28] There must be some basis for believing that the alternative process on which his standard is based was a realistic alternative, and not some process the only possible value of which is to make the patentee's process appear more useful than, in fact, it is. Where Devex's $1.53 figure derives from comparing the cost of forming a bumper using an outdated process[29] which appears to have been so expensive that as early as 1950 industrial publications recommended against using it and all of G.M.'s various divisions followed this advice, the Court finds that Devex's standard of comparison is unacceptable and that its $1.53 figure is irrelevant.

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[28] Gordon Form Lathe Co. v. Ford Motor Co., 133 F.2d 487, 495 (6th Cir. 1943).

Another factor militating against the high royalty Devex now seeks is the fact that Devex did not own or operate its own manufacturing plant. Devex could reap the benefit of its patent only by convincing others to use it, offering them a patent license at an acceptably low rate. For these reasons, the Court rejects Devex's very high royalty demand.

Instead, the Court finds that a figure totalling 0.75% of sales is a reasonable royalty for G.M.'s infringement. Indeed, it is the very figure at which Devex voluntarily offered to license its patent in 1964. At that time, Devex was dealing from a position of strength because the Seventh Circuit had declared its patent valid and the Supreme Court had declined to review this decision. The 0.75% figure is not overly generous. *Compare Randolph Laboratories v. Specialties Development,* 213 F.2d 873 (3d Cir. 1954). Still, it is large enough to compensate Devex fully.

The Court recognizes that patentees must carry the burden of proving the level of royalties to which they are entitled. *W.L. Gore & Associates, Inc. v. Carlisle Corp.*, 198 U.S.P.Q. 353 (D.De. 1978). A patentee, however, need not prove its case to an unreasonable certainty. *Gordon Form Lathe Co. v. Ford Motor Co.,* 133 F.2d 487, 394 (6th Cir. 1943). Thus, where there is evidence that a patentee made a reasonable and *bona fide* licensing offer, it becomes defendant's duty to show the level by which, the offer exceeds a reasonable royalty.[30] In this case, G.M. failed to adduce a shred of reliable evidence that Devex's offer was unfair.

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[29] DX-A-9, Item 1, p. 251.

The Master found that the 0.75% figure should be reduced by one third. This finding was based upon the idea that 0.75% was only a bargaining figure from which Devex's negotiations could be expected to retreat. Royalty calculations, however, must be based upon evidence — not mere speculation. *Trio Process Corporation v. L. Goldstein's Son, Inc.* 533 F.2d 126 (3d Cir. 1976). Without some evidence showing that Devex would have accepted a lower royalty figure and, if so, what that lower figure might be, this reduction is improper. The Court, therefore, accepts 0.75% of sales, or $8,607,183.70, as a reasonable royalty for G.M.'s use of the Claim 4 processes for forming bumpers.

Devex next attacks the Master's recommendation against awarding any damages for G.M.'s use of the Claim 4 process to make non-bumper parts. Devex claims that the use of its process permitted G.M. to make substantial savings of which, Devex claims, it is entitled to 56.5%. Devex again focuses on uneconomical techniques, including machining and hot forging.[31] Devex claims that its focus is justified by the fact that G.M., in determining when to authorize the investment for equipment necessary to use the infringing process, sometimes calculated its expected savings versus the cost of continuing to use its older machining or hot-forging equipment.

Devex's argument must be rejected. Hot-forging and machining techniques are too old and inefficient to be viewed as viable alternative methods to make the kinds of non-bumper parts that G.M. used Devex's Claim 4 process for. Devex's proposed basis for comparison then is unacceptable. Devex failed both to suggest and to offer proof regarding any other means to calculate the reasonable royalties to which it is entitled. Because Devex thus failed to prove the level of damages to which it was entitled, the Master properly found that it should receive nothing. *W.L. Gore & Associates, Inc. v. Carlisle Corp.*, 198 U.S.P.Q. 353, 367 (1978).

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[30] The rationale for reversing the burden of proof here is the same as that which is articulated by Gordon Form Lathe Co. v. Ford Motor Co., 133 F.2d 487, 394-96 (6th Cir. 1943).

[31] Plaintiff's Brief, p.129.

Assuming, *arguendo* that Devex's standard of comparison is acceptable, Devex is not automatically entitled to the damages it would claim. Rather, G.M. must be afforded an opportunity to offer alternative standards for comparison. *Gordon Form Lathe Co. v. Ford Motor Co.*, 133 F.2d 487, 396 (6th Cir. 1943). In this case, the Master painstakingly reviewed the benefits of Devex's process versus those of other non-infringing pressure forming operations. He found that G.M.'s various divisions easily substituted non-infringing processes to manufacture non-bumper parts. Apparently, then, Devex's process was of "relatively slight importance to" G.M., and for this reason the Master properly found that G.M. should not be required to pay anything for its infringement in the manufacture of non-bumper parts.

Devex next complains that the Master improperly rejected its claim for multiple damages and attorneys' fees. As the Master found, however, G.M.'s defense of this case is not characterized by the inequitable dealings normally required for the award of multiple damages under 35 U.S.C. §284 or of attorneys' fees under 35 U.S.C. §285. Accordingly, the Court approves the Master's determination of these issues.

DEFENDANT'S OBJECTIONS TO THE MASTER'S FINDINGS

G.M. first argues that the Master improperly found that the Third Circuit Court of Appeals previously ruled that processes using "Bonderlube 235" infringed Devex's patent. G.M.'s argument looks to the history of this litigation. Shortly after this litigation was transferred here, this Court ruled that of the three accused practices, including one that used "Bonderlube 246" and two that used "Bonderlube 235", none were infringing. This decision was reversed on appeal in an opinion in which the reviewing Third Circuit panel focused on showing the infringing nature of the "Bonderlube 246" process. Defendant now claims that the Third Circuit panel intended to leave standing this Court's judgment that "Bonderlube 235" processes did not infringe Devex's patent Claim 4. The Court finds no support for this claim and rejects it for the reasons set forth by the Master.[32]

G.M. next seeks to narrow the scope of infringing processes, arguing that TKKP and TSP are not borax equivalents, and that TKKP's use in accused practices 6, 14, 50 and 52 does not infringe Devex's patent Claim 4. G.M. first argues that TKKP and TSP are not borax equivalents. The Master properly found, however, that they were such good equivalents that G.M. regularly substituted the use of one for another. G.M.'s main argument is that TKKP and TSP do not meet the terms of Claim 4 because they are not "meltable at a temperature below the melting point of the ferrous metal phosphate" coating. In support of its argument, G.M. claims that while ferrous metal phosphate coatings melt below 1050°C, pure TKKP melts at 1109°C. and pure TSP melts at 1340°C. G.M.'s argument suffers two weaknesses. First, it is unclear that ferrous metal phosphate coatings do not melt at some higher temperature. Moreover, it is unclear that TKKP and TSP, as they are used in the involved practices, melt at the elevated temperatures that G.M. claims. TKKP and TSP are not pure, but are mixed with phosphate and soap. As the

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[32] Master's Report, pp. 9-16.

Master found, this causes TKKP and TSP to melt at lower temperatures, far below the temperatures at which the phosphate coating melts. This finding is well supported by experiments, including several in which objects coated with phosphate and TKKP and TSP were heated to a temperature well below 1050° C. Although the TKKP and TSP melted, the phosphate coating did not. Accordingly, the Court finds that the Master's findings on these issues are not clearly erroneous.

G.M. next argues that the Master's royalty assessment was overly generous, suggesting that values approaching a few hundred thousand dollars might be more reasonable. G.M's several proposed figures derive from a 1955 assignment, a 1956-57 licensing offer, a partial assignment in 1964 and some 1968 settlements. The problem with G.M.'s argument is that these various events are insufficiently relevant to determine what the major infringer of Devex's patent should pay to use a process which was known to be validly patented. Thus, the 1955 assignment and the 1956-57 licensing offer came before it was known that Devex's patent was valid; the partial assignment in 1964 likely involved many contingencies, including the time and money that would be required to tap the patent's true value and the 1968 settlements included marginal infringers against whom it might have been uneconomical to litigate the issues of their infringement fully. G.M. finally relies upon a 1970 estate tax valuation. This Court doubts that the circumstances controlling the negotiations between IRS agents and attorneys for an estate holding an approximately one-ninth interest in a patent are sufficiently similar to those which would control the negotiations between Devex and G.M. to merit much attention. Accordingly, the Court follows the Master's lead and rejects G.M.'s proposed valuations.

G.M. next attacks the Master's award of pre-judgment interest to Devex. G.M.'s argument lacks merit. The purpose of this accounting is to determine the reasonable royalty for G.M.'s infringement. This royalty should approximate the actual royalty G.M. would have been paid had it been able to reach some accord with Devex. The Court calculated this royalty based on payments coinciding with G.M.'s use of Devex's patent. G.M.'s payments did not follow this schedule. Indeed, G.M. has yet to pay anything. Thus, it must now be charged a premium for the additional benefit it has enjoyed from retaining the use of the royalty money over the many years since its first infringement. To do otherwise would systematically undercompensate patentees and encourage their infringers to continue fighting lawsuits long after the disappearance of any justification for doing so for the sole purpose of gathering in generous interest money that rightfully belongs to someone else.

The Court, therefore, approves the payment of interest, and it further approves the computation of such interest at the corporate bond rate as recommended by the Master. The Master, however, calculated interest on the amount of his recommended award through October 31, 1979 only. The interest calculation, thus needs to be revised to account for this Court's changes and updated to the date when, after all appeals have run their course, G.M. pays for its infringement. The Court is hopeful that the parties, modeling the Master's calculations, will be able to agree without further assistance upon Devex's due. Should they be unable to do so, the Court will call upon the Master's able assistance.

COSTS

Remaining to be discussed is the division of costs, a topic which the Master did not treat. Rule 54 provides that "costs should be allowed as of course to the prevailing party." A prevailing party is the party which, although it might not sustain all of its claims, receives a favorable judgment.[33] Rule 54 further provides that a court may, in the exercise of sound discretion, vary this rule, but the situations in which this is done appear to be limited, involving unnecessary delay or only slight success on the part of the prevailing party, etc.[34] In this case, Devex has done no worse than fully litigate its claims achieving a large judgment in its favor. The Court, thus, sees no reason for relieving G.M., whose infringement necessitated this case, from the normal responsibilities of a wrongdoer.

G.M. asks, however, that at least a portion of the Master's fee be taxed to Devex. Costs of reference are treated as costs within the meaning of Rule 54.[35] Although courts are empowered to treat differently the payment of masters' fees and the payment of other costs,[36] the Court sees no reason for doing so here. Consequently, it will order G.M. to pay the Master's entire fee.

Any issues not addressed by this Opinion have nevertheless been considered by the Court and found to be without merit.

Submit Order.

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[33] 6 J.Moore, Federal Practice, ¶54.70[4] (2d Ed. 1980).

[34] 6 J. Moore, Federal Practice, ¶54.70[5] (2d Ed. 1980).

[35] Dyker Building Co. v. United States to use of Parreco, 182 F.2d 85 (D.C. Dir. 1950).

[36] 5A J. Moore, Federal Practice, ¶53.04[1] (2d Ed. 1980).

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, et al.,	)	
Plaintiffs,	)	
	)	Civil Action
v.	)	No. 3058
GENERAL MOTORS CORPORATION,	)	
Defendant.	)	

FINAL JUDGMENT

This cause having been referred to a duly appointed Special Master, after the Court of Appeals for the Seventh Circuit held Claim 4 of Henricks patent No. Re. 24,017 ("Claim 4") valid (321 F2d 234 [1963]) and after the Court of Appeals for the Third Circuit held that defendant had infringed Claim 4 (467 F2d 257 [1972]), to determine which of defendant's non-adjudicated accused practices infringed Claim 4 and to set a reasonable royalty that defendant should pay for its infringement; and the Special Master, after due pretrial discovery and hearing, having filed his Report on February 7, 1980; and the parties having filed and briefed their respective objections to the Report; and the Court, after due consideration, having rendered its Opinion thereon on August 22, 1980,

NOW, THEREFORE, for the reasons set forth in the Court's aforesaid opinion,

It is hereby ORDERED, ADJUDGED, and DECREED that:

1. (a) The Special Master's determination, that it is the law of the case that each of the three prior trial practices ("Bonderlube 246", Pontiac bumper forming process, and "Bonderlube 235", valve lifter plunger forming process and rocket forming process), which were before the Court of Ap-

peals for the Third Circuit, were ruled by it to infringe Claim 4, is hereby adopted.

(b) The Special Master's findings, that the accused practices numbered 4, 5, 7, 9, 12, 13, 16, 17, 22, 25 (piston rings and piston studs), 26, 27, 28, 30, 31, 36, 37, 38, 42, 47, 48, 49, 51, 54, and 56 infringed Claim 4, are hereby adopted.

(c) The Special Master's findings, that tetrapotassium pyrophosphate (TKPP) and trisodium phosphate (TSP) were borax equivalents, hence accused practices numbered 6, 14, 50, 52, and 53 infringed Claim 4, are hereby adopted.

(d) The Special Master's findings, that accused practices in which borax or equivalent rinses were used did not infringe, are rejected; and it is hereby found that accused practices numbered 1 (before 1964), 18, 23, 24, 29, 32, 43, 55, 57 and 58 infringed Claim 4.

(e) The Special Master's findings that Claim 4 requires cleaning as an integral step of its process, and hence accused practices numbered 2, 3, 10, 11, 15, 19, 20, 21, 25 (piston rods), 33, 34, 35, 39, 40, 41, 44, 45 and Oldsmobile Sun Gears, all of said practices involving little or no cleaning, did not infringe Claim 4, are hereby adopted.

(f) The Special Master's findings, that accused practices numbered 1 (after 1963), 8, and 46 did not involve the use of borax or equivalents, and therefore that they did not infringe Claim 4, are hereby adopted.

2. (a) The Special Master's finding of the reasonable royalty payable by defendant on its infringing bumper manufacture is modified by increasing the amount from $5,731,455.80 to $8,813,945.50.

(b) The Special Master's findings that plaintiffs had failed to prove the level of damages to which they were entitled for defendant's infringement in the manufacture of non-bumper parts, and that the infringing process was of "relatively slight importance" to defendant in such manufacture, are hereby adopted.

(c) The Special Master's finding and recommendation, that defendant be required to pay interest on the reasonable royalty from respective year-end dates of infringement to date of judgment at prevailing corporate bond rates, are hereby adopted and approved.

(d) The Special Master's finding and recommendation, rejecting plaintiffs' claim for multiple damages and attorney's fees, are hereby adopted and approved.

3. Plaintiffs are hereby allowed their costs, to be taxed against defendant; defendant shall pay the entire fee of the Special Master as part of said costs.

4. Any issues not addressed by this Court's opinion have nevertheless been considered by this Court and found to be without merit.

5. Defendant General Motors Corporation shall pay to Plaintiffs:

(i) $8,813,945.50 plus prejudgment interest in the amount of $10,912,291.05 (which represents interest through August 31, 1980) totalling $19,726,236.55; plus prejudgment interest of $3,071.22 for each day thereafter up to and including the date of entry of this judgment;

(ii) plus postjudgment interest "from the date of entry of this judgment at the rate allowed by State law" as provided by 28 USC 1961.

(iii) with costs.

/s/ Caleb M. Wright
United States District Judge

Dated: October 6, 1980.

UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

Nos. 80-2550 and 80-2551

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. Te GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE Te GROTENHUIS, WILLIAM C. McCOY, JR., and KATHERINE M. BASSETT

v.

GENERAL MOTORS CORPORATION

Devex Corporation, Technograph, Inc., William C. McCoy, Jr., individually and as Executor of the Estate of William C. McCoy, deceased, Theodore A. Te Grotenhuis, Frederick B. Ziesenheim, Marjorie Te Grotenhuis, and Katherine M. Bassett,
Appellants in No. 80-2550

General Motors Corporation,
Appellant in No. 80-2551

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

D.C. Civil No. 3058

Argued September 18, 1981

Before: GIBBONS, HUNTER, *Circuit Judges*
and STERN,* *District Judge*

(Opinion filed December 15, 1981)

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*Honorable Herbert J. Stern, United States District Judge for the District of New Jersey, sitting by designation.

OPINION OF THE COURT

HUNTER, *Circuit Judge.*

1. Plaintiffs charge defendant with massive patent infringement. The patent ("Claim 4," "Devex patent," "Henricks process") which is at the root of this litigation provides as follows:

> The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed there through a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

This process is used in cold forming metal car parts by pressure.

> The happy result of [the Devex] process is that phosphate, soap and borax work to lubricate the pressure-forming operation, preventing harmful contact between the metal products and the machinery with which they are formed. . . . [The Devex process] is especially beneficial because it may be easily cleaned from the metal product following its formation.

Devex Corp. v. General Motors Corp., 494 F. Supp. 1369, 1372 (D. Del. 1980). The Devex patent expired in 1969; thus, only damages issues are before us.

2. This litigation, which began twenty-five years ago, is now in the accounting phase. Defendant and plaintiffs cross-appeal from the judgment of the district court, which was based in part on the report of a Special Master. For the reasons which follow, we will affirm.

I. Procedural History

3. The complaint in this case was filed November 13, 1956 in the Northern District of Illinois. After a trial, Judge Robson of that court held on February 1, 1962 (final judgment entered June 29, 1962) that the Devex patent was invalid. The United States Court of Appeals for the Seventh Circuit reversed, *Devex Corp. v. General Motors Corp.*, 321 F.2d 234 (7th Cir. 1963), *cert. denied*, 375 U.S. 971 (1964), and held that the patent was valid because "the elements which Henricks selected were put together in a new way and achieved a new and unexpected result." 321 F.2d at 236. The court further stated:

> There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties.

321 F.2d at 237. In other words, the use of a borax and soap combination in conjunction with phosphate resulted in improved lubrication of the metal during the deforming (cold forming by pressure) process and in improved cleanability of the product after its formation. The improved lubrication and cleanability combined to make the process patentable.

4. The court of appeals remanded the case for further proceedings. At that point, General Motors moved to have the case against it transferred to Delaware, and its

motion was granted. *Devex Corp. v. General Motors Corp.*, 146 U.S.P.Q. 346 (N.D. Ill. 1965).[1]

5. Judge Wright of the United States District Court for the District of Delaware ruled in 1967, in the suit between Devex and General Motors, that summary judgment in favor of plaintiffs on the issue of infringement was inappropriate. *Devex Corp. v. General Motors Corp.*, 263 F.Supp. 17 (D.Del. 1967). In 1968, he granted a motion by Devex for permission to amend its complaint to assert the doctrine of equivalents. *Devex Corp. v. General Motors Corp.*, 285 F. Supp. 109 (D.Del. 1968).[2]

6. After an infringement trial, Judge Wright ruled that the patent had not been infringed by General Motors. 316 F.Supp. 1376 (D.Del. 1970). That ruling was reversed by this court. *Devex Corp. v. General Motors Corp.*, 467 F.2d 257 (3d Cir. 1972), *cert. denied*, 411 U.S. 973 (1973). We rejected the district court conclusion "that infringement was not proved because Devex failed to establish that General Motors achieved the unexpected results that made the Henricks combination patentable." 467 F.2d at 260. After examining the materials before us, we concluded that the accused practices led to satisfactory lubricity and cleanability, which meant that those practices infringed. We specifically rejected General Motors' contention that, because the chemical reactions involved were arguably different from those taught by the Henricks patent, the General Motors practices did not infringe.

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[1] After the transfer of the case against General Motors to Delaware, Judge Robson in Illinois granted summary judgment for plaintiffs on the infringement issues. Devex Corp. v. Houdaille Industries, Inc., 148 U.S.P.Q. 74 (N.D. Ill. 1965). The Court of Appeals reversed, 382 F.2d 17 (7th Cir. 1967), and the suit against Houdaille was thereafter settled.

[2] Judge Wright resolved a discovery dispute at 275 F.Supp. 310 (D.Del. 1967).

> [I]f it is directly determinable that the two lubricants have essentially the same components, are applied in the same way and that the results of their use are essentially the same, the disputation of chemists about the chemical interactions that occurred in the processes cannot be decisive.
>
> Moreover, it may well be that chemical reactions differed in degree, and perhaps in kind as well, in different applications of the Henricks process. Claim 4, even as restricted and held valid in the Seventh Circuit, covers and protects the combination of soap and borax in proportions to be varied according to the nature and difficulty of the draw to be facilitated so that the process will yield its claimed advantages over a wide range of drawing pressures and temperatures. It is not claimed that in every Henricks mix under every temperature, chemical reaction and its products will be identical. Thus, if one accepts as persuasive the testimony of GM experts that reactions and substances produced during the GM drawings were not identical with those that the Henricks process is said to have produced using different proportions of ingredients under different pressures at different temperatures, it does not follow that GM practice failed to produce the results that made the Henricks process patentable.
>
> In these circumstances, the demonstrated effectiveness of GM practice in producing the satisfactory drawing and ease of cleaning that Henricks had achieved must prevail over any contrary inference drawn from disputed expert testimony as to comparative chemistry in what may well not have been equivalent situations.

467 F.2d at 261-62. Thus, because the results produced by the accused practices were identical to those produced by the Devex patent, the accused practices infringed. The differences between the specific chemical

processes of the Devex patent and those of the accused practices were not determinative, so long as the results were identical.

II. Issues Now on Appeal

A. *The Special Master's Report*

1. *Infringement Issues*

(a) *Borax-based lubricants*

7. Based upon our prior opinion, 467 F.2d at 261, the Special Master ruled that the accused practices which involved the use of borax-based lubricants (soap and borax) in cold forming bumpers and non-bumpers infringed the Devex patent, where the use of those lubricants led to cleanability in conjunction with lubricity, and where the advantages of both the cleanability and lubricity were used by General Motors. Thus, the Special Master concluded that accused bumper practices 4, 5, 12, 13, 36, 48, 49, 51, and non-bumper practices 7, 9, 16, 17, 22, 25 (in part), 26, 27, 28, 30, 31, 37, 38, 42, 47, 54 and 56 infringed the Devex patent. Special Master's Report at 27; Appendix at 287.

(b) *TKPP and TSP substituted for borax in lubricants*

8. The Special Master also ruled that General Motors' use of tetrapotassium pyrophosphate (TKPP) as a borax substitute in bumper making (accused practices 6, 14, 50, 52, and 53) and of trisodium phosphate (TSP) as a borax substitute in non-bumper making (accused practices 3, 11, 15 and 45) infringed the Devex patent. Special Master's Report at 29-38; Appendix at 289-298.

9. The Special Master found as a fact that "TKPP was put in [to the lubricant] as a borax substitute, to help the soap do the job of efficiently lubricating the

workpiece." Special Master's Report at 31; Appendix at 291. General Motors argued that the use of TKPP did not infringe the patent because pure TKPP melts at a higher temperature than the ferrous metal phosphate coating, which meant that TKPP did not fit the literal language of the patent. The Special Master rejected that argument, found as a fact that TKPP, when mixed in the coatings and as a matter of actual practice, melts before the ferrous metal phosphate coating, and concluded that the use of TKPP as a borax substitute to improve lubricity and cleanability therefore infringed the Devex patent. Special Master's Report at 32-37; Appendix at 292-297. The Special Master also found that TSP (accused practices 3, 11, 15, 45) has a lower melting point than the ferrous metal phosphate coating, and that if it were used as a borax substitute to obtain improved lubricity and cleanability it would infringe the Devex patent. Special Master's Report at 37-38; Appendix at 297-98.

(c) *Accused practices involving no actual cleaning*

10. The Special Master held that accused practices 2, 3, 10, 11, 15, 19, 20, 21, 25 (in part), 33, 34, 35, 39, 40, 41, 44 and 45 did not infringe the Devex patent. Some of those practices involved little or no actual cleaning of the part after its formation; some involved a cleaning process which, unlike the easy cleaning process used on borax-treated parts, would have removed the residue even if the Devex process had not been used. Because "ease of cleaning is an element vital to the life of the patent," the Special Master held that those practices which do not involve cleaning of the part cannot infringe the patent. Special Master's Report at 39-43; Appendix at 299-303.[3]

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[3] None of the accused practices using TSP involved cleaning. Special Master's Report at 43; Appendix at 303.

(d) *Borax Rinses*

11. Accused Practices 1, 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 43, 55, 57 and 58 allegedly involved the use of a neutralizing rinse (as opposed to a lubricant) containing borax.[4] The Special Master concluded that the use of rinses containing borax did not infringe claim 4, for the following reasons:

i) There was no evidence that borax (or equivalent) rinses were used to lubricate the metal or to aid in cleaning. Special Master's Report at 46; Appendix at 306.

ii) The borax was used solely to neutralize acid carryover resulting from the phosphate bath. Numerous other techniques which did not involve borax were also used to achieve this result. Special Master's Report at 46-47; Appendix at 306-07.

iii) Example XXXV in the 1950 Henricks patent application set forth the use of a borax rinse to neutralize the acid. Example XXXV was cancelled by Henricks when the "patent examiner required that the specification be shortened and limited to 'such parts of it as are commensurate with claims that applicant will continue to prosecute.' " Moreover, Henricks testified that "neutralizing rinses were old and well known." Special Master's Report at 47-48; Appendix at 307-08.

iv) Henricks did not invent the use of borax as a neutralizing rinse. Special Master's Report at 48-49; Appendix at 308-09.

v) Defendant thought it was using borax rinses to neutralize acid, and not for lubrication or cleanability. Defendant used non-accused rinses as well as accused rinses, and easily shifted back and forth. Special Master's Report at 49-50; Appendix at 309-10.

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[4] Accused Practice 29 involved using TSP as a neutralizing rinse. The analysis applicable to the borax-containing rinses applies to Accused Practice 29 as well, and also applies to any rinse practices which contained the infringing borax substitutes (TKPP and TSP).

vi) Plaintiffs could have, but did not, contend that certain of the borax rinse processes infringed the patent prior to and at the infringement trial. Special Master's Report at 50; Appendix at 310.

vii) It would make no sense for defendant to seek the benefits that the borax-containing lubricant could provide in a rinse, rather than by the use of the borax-containing lubricant. Special Master's Report at 51; Appendix at 311.

(e) *Accused Practices 1, 8 and 46*

12. Plaintiffs argued that Accused Practices 1, 8 and 46 involved the use of borax, and that they infringed Claim 4 for that reason.

13. The Special Master discussed the factual question of whether Accused Practices 1, 8 and 46 contained borax at pages 53-59 of his report (Appendix at 313-319), and, after weighing the evidence adduced by each side, concluded that they did not.

2. *Damages Issues*

(a) *Multiple Damages and Attorney's Fees*

14. The Special Master ruled that an award of multiple damages and of counsel fees would be inappropriate in this case. "[T]wo highly respected jurists [Judges Robson and Wright] have reached the selfsame conclusions for which plaintiffs now accuse defendant of bad faith." Special Master's Report at 67-68; Appendix at 327-28. The Special Master also found explicitly that defendant had not been guilty of bad faith. Special Master's Report at 70; Appendix at 330.

(b) *Infringement in Bumper-Making: Facts*

15. Title 35 U.S.C. §284 provides in part:

> §284. Damages
>
> Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

The Special Master, noting that plaintiffs were not themselves the manufacturers, ruled that damages would take the form of a reasonable royalty, and that the royalty would be ascertained "by reference to hypothetical negotiations." Special Master's Report at 71; Appendix at 331.

16. The Special Master first examined the Devex patent as used in bumper making. The Oldsmobile division of General Motors, throughout the life of the Devex patent, cold formed bumpers without infringing the Devex patent. The Special Master thus found as a fact that "Oldsmobile was successful in cold forming bumpers without the use of the Henricks process during the entire life of the patent." Special Master's Report at 77; Appendix at 337. "To sum up, Oldsmobile's experience shows it was commercially practicable throughout the life of the Henricks patent to cold form bumpers without utilizing the Claim 4 process." Special Master's Report at 79; Appendix at 339.[5]

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[5] During 1962 and 1963, Oldsmobile used Accused Practice 43 (a rinse). The conclusion that Oldsmobile at no time infringed the patent thus depends upon the ruling that the use of rinses did not infringe the patent. However, even if accused Practice 43 infringed the patent, Oldsmobile used non-infringing processes to make the vast majority of its bumpers (all except those made in 1962 and 1963), and the Special Master's factual conclusion that Oldsmobile successfully cold formed bumpers without the Devex process remains sound.

17. Bumpers at the Chevrolet division of General Motors were hot forged until 1954. In 1954, a new plant began cold forming bumpers for Chevrolet; the lubricant used was plain soap over phosphate. Bumper production was satisfactory without borax or an equivalent.

18. By 1957-58, Chevrolet was experiencing plating problems,[6] and in November 1958, Chevrolet switched to a lubricant which contained borax and infringed the Devex patent. From November 1958 to mid-January 1965, Chevrolet used infringing processes (containing borax) to manufacture 93% of its bumpers. Chevrolet used non-infringing processes to a limited extent (7%) during that period. From 1965 until the patent expired, Chevrolet used infringing processes (containing TKPP) to cold-form approximately 84% of its bumpers. In sum, the Special Master found that Chevrolet used the Devex process because Chevrolet thought the Devex process was *better*, but rejected plaintiffs' contention that the Devex process was *essential*. In reaching this conclusion, the Special Master carefully weighed conflicting testimony. Special Master's Report at 79-91; Appendix at 339-351.

19. The Pontiac division of General Motors used a plastic coating (non-infringing) process in making its bumpers from 1952-1955. From late 1955 through the 1968 model year, Pontiac used infringing processes to make its bumpers, with the exception of the 1956 model year, during which Pontiac used the plastic spray for some of its bumpers. In August 1968, Pontiac switched to a non-accused process. Special Master's Report at 91-96; Appendix at 351-356.

20. The Special Master found that the Henricks process in use at Pontiac was superior to non-infringing practices, but that the Henricks process was "not

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[6] Bumpers must be cleaned prior to plating; if the cleaning is inadequate, the plating will be likewise.

indispensable." Special Master's Report at 97 & n., Appendix at 357 & n.. After weighing conflicting evidence, the Special Master concluded that "Henricks' lubricants came to be regarded by Pontiac as more satisfactory, but others would have done the job." Special Master's Report at 98; Appendix at 358.

21. The Cadillac division of General Motors cold formed its bumpers from 1952 through the 1962 model year without infringing the Devex patent. Cadillac switched to the Devex process in the 1962 model year, and used it until July 1968 for 100% of its bumpers. In 1968, Cadillac switched to a non-infringing practice. Again, the Special Master found that the Henricks process resulted in benefits to General Motors, but that it was not essential. Special Master's Report at 100-01; Appendix at 360-61.

22. At Fisher Body-Elyria Bumper Parts, General Motors infringed the patent from April 1957 through March 1960. Non-accused or non-infringing practices were used at all other times relevant to this suit. Special Master's Report at 101-02; Appendix at 361-62.

23. The Special Master's factual finding as to infringement in bumper making, in sum, is that the three major infringing divisions (Pontiac, Chevrolet and Cadillac) used the Henricks process because it was better than non-infringing alternatives, but not because it was essential or because there were no commercially viable non-infringing alternatives available. Indeed, Oldsmobile's experience proves the availability of practicable alternatives. There were periods when one or more of the infringing divisions used nonaccused or non-infringing practices. This leads inexorably to the factual conclusion that non-infringing cold forming alternatives to the Devex process existed: if there had been no choice, defendant would have infringed the patent 100% of the time.

(c) *The Reasonable Royalty: Bumpers*

24. Plaintiffs sought as a royalty for bumper infringement a percentage of the sale price of the bumpers. The percentage plaintiffs sought depended upon their factual contention that the Devex process was essential to defendant's cold forming of bumpers. The Special Master rejected plaintiffs' premise when he found as a fact that non-infringing, commercially practicable cold forming processes existed. He also rejected the royalty rates proposed by General Motors, which were based in the alternative on the cost of the lubricants, the sale price of the patent, the value given the patent for estate tax purposes, settlements reached by plaintiffs with other infringers, and the royalty rate which the owners of the patent charged a company owned by the same persons who owned the patent at the time.

25. The Special Master decided to base the reasonable royalty on an offer made by plaintiffs in 1964 to license the patent for three quarters of one percent (.75%) of the sale price of the bumpers. The Special Master postulated hypothetical negotiations, stressed the availability of viable alternatives to the Devex patent, added that Oldsmobile produced bumpers without the Devex process but that Chevrolet, Pontiac and Cadillac were loyal to the Devex process, noted that the Devex process did have a considerable value, and ultimately reduced the .75% figure — which he decided would have been plaintiffs' opening offer — by approximately one-third.

(d) *Infringement in Non-Bumper making: Facts and Reasonable Royalty*

26. Plaintiffs argued before the Special Master that defendant's choice was between "cold forming non-bumper parts through Henricks, or not cold forming at all." Special Master's Report at 103; Appendix at 363. The Special Master rejected this contention, and

> [found] the fact to be that non-bumper parts could be and very often were, cold formed by defendant without the use of Henricks. Indeed the question does not even seem to me to be a close one. The evidence is that, far from dominating the field, the Henricks process had relatively slight importance to defendant in the production of non-bumper extruded parts.

Special Master's Report at 104; Appendix at 364.

27. The Special Master then examined the impact of this conclusion on plaintiffs' damages claims for non-bumper infringement. Plaintiffs sought a percentage of the difference between the cost of producing non-bumper parts by machining or hot forging and by using the Devex process. The Special Master noted that a reasonable royalty cannot be based on speculation, although "a fair approximation based on the evidence will suffice." Special Master's Report at 111; Appendix at 371. He continued:

> By relying in their savings-and-gains proof solely on the (erroneous, as I have found) premise that defendant could have cold formed non-bumper parts only through Henricks, plaintiffs have offered no evidence on which a royalty might be reasonably based.

Special Master's Report at 111-12; Appendix at 371-72. Although there had been sufficient evidence with regard to bumpers to supply a fall-back position (the .75% offer), there was no such alternative presented with regard to non-bumper parts, and plaintiffs were therefore not entitled to royalties on the non-bumper infringement of the patent.

(e) *Interest*

28. The Special Master awarded interest "as a matter of fact," after finding that the hypothetical bargainers would arrange for interest as part of the reasonable royalty. Special Master's Report at 140-41; Appendix at 400-01. He also ruled that plaintiffs were entitled to prejudgment interest (delay damages) at the prevailing corporate bond rate as a matter of law, and that that interest should be calculated each year based on the number of infringing parts made in that year.

B. *The District Court Opinion*

29. The district court, turning first to plaintiffs' claims of error, affirmed the ruling of the Special Master that "[p]ractices as to which little or no cleaning was required do not infringe." 494 F.Supp. at 1375. The trial court interpreted prior decisions in the Devex litigation as "holding that Claim 4 requires cleaning as an integral step of its process." *Id.* at 1373. The court stated:

> The primary importance of Devex's process was not that the addition of borax somehow enhanced lubricity. Rather, the addition of borax inhibited the formation of zinc stearate resulting in products that could be easily cleaned. [In the validity phase of this litigation], Devex . . . relied upon the ease of cleaning to defend the validity of what would otherwise have been an overly broad claim.

494 F.Supp. at 1374-75.

30. The trial court then turned to the issue of whether borax rinses infringed the Devex process. He ruled that the borax rinses did infringe the patent, but only where the parts formed after the rinse was applied were cleaned. In other words, if the rinse performed the same role as the lubricant, it infringed the patent.

31. The trial court affirmed the Special Master's fact finding that accused practices 1, 8 and 46 did not infringe, noting that the "clearly erroneous" standard of

review applied under Fed. R. Civ. P. 53(e)(2), and that the Special Master had "meticulously reviewed and resolved this evidentiary dispute . . . ." 494 F.Supp. at 1376.

32. The trial court then turned to the reasonable royalty rate. The court agreed with the Special Master's findings that

> . . . Oldsmobile used non-infringing practices to make almost all of the bumpers. Similarly Chevrolet relied, though less successfully, upon non-infringing processes until November, 1958, and used non-infringing processes to manufacture part of its bumper needs from 1960 to 1963 and from 1965 to 1966. Cadillac used non-infringing processes prior to 1962 and after 1968. Fisher Body used non-infringing processes prior to 1957 and after 1960. Where G.M.'s various divisions so often produced marketable cars without using Devex's process, the Court finds, as the Master did also, that G.M.'s negotiators would not have agreed to the high figure Devex now proposes.

494 F.Supp. at 1376-77. The court disagreed, however, with the reduction in the .75% licensing offer, and ruled that in the absence of evidence tending to show that Devex would accept a figure less than .75%, the reduction was improper because speculative. Thus, the court accepted .75% of the sale price as the royalty for bumper infringement.[7]

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[7] The trial court awarded plaintiffs $8,813,945.50 in royalties; $10,912,291.05 in prejudgment interest for the period through August 31, 1980; $3,071.22 in prejudgment interest for each day from (and including) September 1, 1980 *through* October 6, 1980 (the day the final judgment was entered); post-judgment interest at the rate allowed by state law from October 7, 1980 until payment of the award to plaintiffs by defendant; and costs. Final judgment at 3-4; Appendix at 467-68.

33. The court affirmed the Special Master's refusal to award royalties for non-bumper infringement:

> In this case, the Master painstakingly reviewed the benefits of Devex's process versus those of other non-infringing pressure forming operations. He found that G.M.'s various divisions easily substituted non-infringing processes to manufacture non-bumper parts. Apparently, then, Devex's process was of "relatively slight importance to" G.M., and for this reason the Master properly found that G.M. should not be required to pay anything for its infringement in the manufacture of non-bumper parts.

494 F.Supp. at 1378.[8]

34. The trial court then turned to General Motors' claims of error. The court rejected General Motors' contention that this court, in discussing Bonderlube 235 in its prior opinion, intended only to reverse the judgment of non-infringement as to Bonderlube 235 and to leave the rest of the trial court judgment, which dealt with other compounds, intact. The trial court also rejected General Motors' contentions that TKPP and TSP did not infringe, that the royalty rate should have been based on other factors, that the Special Master should not have assessed prejudgment interest, and that General Motors should not be liable for costs (including the Special Master's fee).

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[8] The trial court also rejected plaintiffs' claim for multiple damages and attorney fees.

C. *Issues now on appeal to this court*

35. Plaintiffs make the following arguments on appeal to this court:

i. The award of a royalty of .75% of bumper sales was unconscionably low. The Special Master and the trial court erred in finding that there were reasonable alternatives to the Devex process available to defendant. Not only were the fact findings of the lower courts clearly erroneous, but also the court and the Special Master erred as a matter of law in disregarding (or refusing to rely upon) plaintiffs' evidence of savings attained through use of the Devex process. The lower court further erred as a matter of law in not relying upon plaintiffs' evidence of savings, because defendant did not refute plaintiffs' showing that there were no alternatives available to General Motors at the time the infringement began which would have yielded results equally beneficial to the results given by the Devex process.

ii. The finding that accused practices 8 and 46 did not contain borax or TKPP was clearly erroneous. Moreover, that defendant admitted that accused practice 46 infringed the patent.

iii. The Special Master and the trial court erred as a matter of fact and of law in refusing to award royalties for non-bumper infringement. The finding that there were alternatives available to General Motors which would give equally beneficial results was clearly erroneous. Moreover, the patent laws require the award of a reasonable royalty where infringement has taken place; thus, to refuse to award damages in a case such as this one, where massive infringement occurred, is erroneous. Finally, General Motors failed to rebut plaintiffs' showing as to what the savings resulting from infringement were, and failed to show that there were in fact alternatives available to General Motors at the time infringement began which would yield equally beneficial results to the Devex process.

iv. The Special Master and the trial court erred in construing the prior opinions written in this case as requiring that a part formed by the Devex process actually be cleaned in order for infringement to have occurred. Attaining the result of cleanability is enough to warrant a finding of infringement, even though the part is not actually cleaned.

36. Defendant raises the following contentions on this appeal:

i. It is erroneous for a court to award prejudgment interest on a reasonable royalty award where the amount of the award was unliquidated until judgment was entered, and in the absence of special circumstances.

ii. The law of the case has restricted the Devex patent to those processes which involve the use of borax. Thus, plaintiffs cannot now argue that the use of TKPP and TSP infringes the patent, both because of the law of the case and because plaintiffs earlier waived the right to assert the doctrine of equivalents.

iii. The Special Master was correct in ruling that the use of rinses which contain borax or its equivalents does not infringe the patent, because the law of the case requires that the use of the Devex patent be for the purposes of attaining lubricity and cleanability, and the use of the rinses has a different purpose entirely. Thus, the district court erred in ruling that the use of the rinses infringes the Devex patent.

iv. The choice by the Special Master of the .75% royalty rate, and his subsequent reduction of that figure by one-third, was erroneous because the correct figure was one of the alternatives suggested by defendant. The increase by the trial court of the rate to the .75% figure compounded the error.

III. Discussion

A. *The Standard of Review*

37. In patent infringement cases, "[t]he awarding of damages involves a subtle judicial function; the statute allows considerable latitude [to the fact-finding court]." *John Zink Co. v. National Airoil Burner Co.*, 613 F.2d 547, 559 (5th Cir. 1980). *See also Milgo Electronic Corp. v. United Business Communications, Inc.*, 623 F.2d 645, 663 (10th Cir.), *cert. denied*, 101 S. Ct. 794 (1980) ("An appellate court must affirm the award if there is substantial record evidence to support it: the trial court's findings will not be set aside unless it is shown that they are clearly erroneous.")

38. The scope of a patent, which is determined by construing the patent, is a question of law. *Studiengesellschaft Kohle mbH v. Eastman Kodak Co.*, 616 F.2d 1315, 1324 (5th Cir.), *cert. denied*, 101 S. Ct. 573 (1980). However, "[t]he issue of patent infringement is a question of fact . . . ." *Id.* at 1322. Moreover, "patent cases, because they so frequently contain conflicts in expert testimony, seem particularly suited for Rule 52(a)'s review limitations [the clearly erroneous standard]." *Id.* at 1323.

39. The Special Master heard testimony during fifty-three days of trial. He wrote an exhaustive and thoughtful report, in which he set forth findings of fact based on a careful weighing of conflicting testimony as well as of documentary evidence. The trial judge, after a detailed analysis of the facts found by the Special Master, and after applying the standard of review set forth in Fed. R. Civ. P. 53(e)(2) (the "clearly erroneous" standard) to those fact findings, decided that none of the Special Master's findings of fact was clearly erroneous. We agree.

40. Whether the Special Master and the trial court ascertained and applied the law correctly to the facts is

subject to a less stringent standard of review than the "clearly erroneous" standard. We have concluded, however, that the Special Master and the trial court ascertained and applied the law correctly. The two differ in only two respects: first, the Special Master ruled that none of the accused rinse practices infringed the patent, while the trial court ruled that those accused rinse practices which involve no cleaning do not infringe, but that those which involve cleaning do infringe. Second, the Special Master reduced the .75% industry-wide offer figure by one-third, while the trial court reinstated the .75% figure. We agree with the results reached by the Special Master and the district court; where the two differ, we affirm the district court.

41. The scope of the Devex patent is largely a question of law. Thus, questions such as whether cleanability (as opposed to actual cleaning) is sufficient to bring a process within the patent are questions of law. The question of which of the accused processes infringed the patent is one of fact. Which processes involved actual cleaning, which processes involved the use of borax equivalents, and the like, are factual issues.

42. When it comes to review of the damages issues, such as whether plaintiffs proposed a reasonable standard of comparison upon which the court could have based a royalty award, identifying a question as one either of fact or of law becomes more problematic. At this point in this case, however, the reasonableness of a proposed standard of comparison is largely factual, because the answer depends upon factual issues, such as whether noninfringing alternatives were available to defendant. If such alternatives were available, it would weigh heavily against plaintiffs' proposed standard of comparison if that comparison depended upon the non-availability of viable alternatives.

B. *Infringement Issues*

1. *Borax-based lubricants*

43. It is clear from prior opinions in this litigation and we reaffirm that the use of borax-based lubricants in cold forming bumpers and non-bumpers infringed the Devex patent where those lubricants contributed to cleanability and lubricity, *and* where General Motors took advantage of the lubricity and particularly of the cleanability in the actual manufacturing process. Ascertaining which of the accused practices fits this category then becomes a matter of fact. No effective challenge to the inclusion of accused practices in this category has been made.[9]

2. *TKPP and TSP Substituted for Borax in Lubricants: The Doctrine of Equivalents*

44. Plaintiffs have asserted the doctrine of equivalents with regard to defendant's use of TKPP and TSP as borax substitutes. In *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950), the Supreme Court discussed the doctrine of equivalents:

> The theory on which [the doctrine] is founded is that "if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form, or shape." [Citation omitted.] The doctrine operates not only in favor of the patentee of a pioneer or primary invention, but also for the patentee of a secondary invention consisting of a

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[9] We reject as wholly without merit defendant's argument that this court, in its prior opinion in this case, intended to differentiate between processes using Bonderlube 246 and those using Bonderlube 235.

> combination of old ingredients which produce new and useful results . . . .

Id. at 608. The Court also established the standard of review applicable to the doctrine:

> A finding of equivalence is a determination of fact . . . . Like any other issue of fact, final determination requires a balancing of credibility, persuasiveness and weight of evidence. It is to be decided by the trial court and that court's decision, under general principles of appellate review, should not be disturbed unless clearly erroneous. Particularly is this so in a field where so much depends upon familiarity with specific scientific problems and principles not usually contained in the general storehouse of knowledge and experience.

Id. at 609-610.

45. "The 'doctrine of equivalents' which governs determinations of infringement requires an assessment of function rather than form in measuring the claims of a patent." *N.V. Maatschappij Voor Industriele Waarden v. A.O. Smith Corp.*, 590 F.2d 415, 421 (2nd Cir. 1978).

> A patented process is infringed only by unauthorized performance of substantially the same process steps in substantially the same way to accomplish substantially the same result. It is not necessary that the accused process be practiced with the same or substantially the same apparatus as disclosed by the patentee. [Citation omitted.] Nor is it necessary that the materials used in the process be identical to those disclosed and claimed as long as they are equivalent.

International Glass Co. v. United States, 408 F.2d 395, 400 (Ct. Cl. 1969). In *International Glass*, the accused practices did not infringe because

> they do not appropriate the gist of the claimed process; are not a mere variation of the details of the

> claimed process; and in fact do not substantially follow the mode taught by the patent.

Id. at 401.

46. "To establish equivalency for the purpose of showing infringement of a patent claim, the patentee has the burden of proving a real identity of means, operation, and result." *Ziegler v. Phillips Petroleum Co.*, 483 F.2d 858, 868 (5th Cir.), *cert. denied*, 414 U.S. 1079 (1973).

> [P]rinciples [of the doctrine of equivalents] are applied to compositions of matter where there is equivalence between chemical ingredients. [Citations omitted.] In [*Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950)] the Supreme Court spoke to the problem of determining what constitutes equivalency.
>
>> "Consideration must be given to the purpose for which an ingredient is used in a patent, the qualities it has when combined with the other ingredients, and the function which it is intended to perform."
>> *Graver, supra*, 339 U.S. at 609 . . . .

Id. at 869.

> In recognition of the fact that a patent would be virtually worthless if it did not protect against devices which incorporate only unimportant variations of the patented device, the doctrine of equivalents provides that a later-developed device will be regarded as the equivalent of the patented device if, although different in form or shape, it "performs substantially the same function in substantially the same way to obtain the same result." [Citation omitted.] In its early development, the doctrine generally was applied in cases involving the equivalence of devices having mechanical components. Today,

> however, the same principles are applied to compositions where there is equivalence between chemical ingredients. [Citation omitted.]

Chemical Cleaning, Inc. v. Dow Chemical Co., 379 F.2d 294, 296 (5th Cir.), *cert. denied*, 389 U.S. 1040 (1967). *See also Rich Products Corp. v. Mitchell Foods, Inc.*, 357 F.2d 176, 177, 182 (2d Cir.), *cert. denied*, 385 U.S. 821 (1966) (defendant infringed patent, where defendant substituted hydroxypropyl methyl, a cellulose, for the alkyl groups specified in the patent, the cellulose was one of the four essential ingredients in the patent, and the substitute chemical performed the same function as the chemical listed in the patent).

47. Here, the Special Master, in the role of fact finder, found, after weighing the evidence, that TKPP and TSP, when substituted for borax, produce the same results (cleanability and lubricity) that borax produces and fit the literal language of the patent in terms of melting point. Cleanability and lubricity are the results which made the Devex process patentable in the first place; thus, TKPP and TSP, which produce those results and which read on the literal language of the patent, infringe the patent. Certainly the fact findings here, that TKPP and TSP are equivalents of borax and infringe the patent, are not clearly erroneous.[10]

48. General Motors contends here that plaintiffs cannot claim the use of TKPP and TSP as infringements because plaintiffs insisted earlier in this litigation that

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[10] Defendant argues that the coaction of TKPP (or TSP) with soap did not produce the same chemical by-products as borax in reacting with soap. That is irrelevant: TKPP and TSP produced the critical results of cleanability and lubricity when substituted for borax. In addition, TKPP and TSP fit the literal language of the patent. This case is thus distinguishable from Sealed Air Corp. v. U.S. International Trade Commission, 645 F.2d 976 (C.C.P.A. 1981), in which the accused process did not read on the literal language of the patent.

borax infringed, and are therefore estopped from asserting that anything other than borax infringed.

49. We disagree. We reject General Motors' contention that earlier opinions in this litigation which referred to the use of borax meant the exclusive use of borax and no other inorganic compound, and, for the reasons discussed herein, we affirm the rulings that the use of TKPP and TSP infringed the patent.[11]

3. *Accused Practices Involving No Actual Cleaning*

50. The validity of the Devex patent depended upon the new results of commercially practicable cleanability and enhanced lubricity. However, the precise question of whether cleanability or cleaning infringes the patent was not reached in either the validity or infringement phases. Where cleanability is irrelevant to the creation of the part involved, one of the factors which saved the Devex patent from invalidity is not present, and the patent has not been infringed. In other words, we hold that while one result which saved the patent is cleanability, a practice does not infringe unless it involves actual cleaning.

4. *Borax Rinses*

51. The Special Master ruled that borax rinses did not infringe the Devex patent, in part because they were

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[11] It is arguable that General Motors has waived its right to make this argument. General Motors' contention that plaintiffs are estopped from alleging that anything other than borax infringes is essentially an argument that plaintiffs cannot assert the doctrine of equivalents. The trial court granted plaintiffs' motion to amend its complaint to assert the doctrine of equivalents *before* the first appeal to this court was taken. 295 F.Supp. 109 (D.Del. 1968). Defendant did not, apparently, raise the propriety of the trial court's action on that appeal, even though many, if not all the arguments which defendant makes now could have been raised in the context of the first appeal.

rinses used to neutralize acid, and were not designed to improve lubricity or cleanability. The trial court agreed that borax rinses did not infringe where they were used solely to neutralize acid, but disagreed with the Special Master's reasoning insofar as it excluded from infringement those rinse practices which were, in fact, used to promote cleaning.

52. We agree with the trial court. That the soap and borax (or equivalent) may be applied to metal in a series of steps, rather than in a combined form, or as a rinse rather than a lubricant, is not determinative of whether a particular practice infringes or not. What *is* determinative is the result produced and the use to which that result is actually put. Where soap and borax are applied to the metal seriatim, instead of in a combined form, the process infringes the Devex patent where cleanability and its effects are put to use in the actual process.[12]

5. *Accused Practice 46*

53. As did the trial court, we conclude that the fact findings made by the Special Master were not clearly erroneous, and affirm the Special Master and the trial court with regard to Accused Practice 46, which did not infringe the patent.

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[12] The decisions of the Special Master and of the trial court are not really inconsistent with each other or with prior rulings in this litigation. In connection with the accused practices which involved little or no cleaning, both agreed that only those practices which involve commercially practicable cleaning could infringe the patent. The Special Master and the trial court agreed that where rinse practices were used solely to neutralize acid, those practices did not infringe the patent. The Special Master and the trial court disagreed only as to those rinse practices which involved actual cleaning. The trial court carried out the logic discussed in Part III (B)(4) *supra* in its ruling; the Special Master applied a strict reading of the patent in reaching his result.

C. *Damages Issues*

54. We now turn to the question of what damages plaintiffs should receive from defendant.

1. *Bumpers*

55. The Special Master concluded, based upon facts found by him, that the Devex process was useful in but not essential to the cold forming of bumpers. We agree that the facts lead to that conclusion.

56. Oldsmobile only infringed the Devex patent in bumper making in 1962-1963, and produced almost all of its bumpers without infringing the Devex process. From 1958-1965, Chevrolet infringed the Devex patent in producing 93% of its bumpers; from 1965-1969, Chevrolet infringed in producing 84% of its bumpers. Pontiac infringed from 1955-1968; Cadillac did not begin infringing until 1962; and Fisher Body-Elyria only infringed between 1957 and 1960. This means, of course, that General Motors did *not* infringe at all other times. If plaintiffs' argument that General Motors could not have efficiently cold formed bumpers without the Devex process were correct, then General Motors would have been compelled to use infringing processes in producing 100% of its bumpers. General Motors did not do so, and we reject plaintiffs' argument.

57. The goal of assessing royalties in patent infringement cases is to place the plaintiff in the same position it would have been in if the patent had not been infringed. The burden is on the party seeking damages to show the amount of those damages. *See Reliance Molded Plastics, Inc. v. Jiffy Products*, 215 F.Supp. 402, 412 (D.N.J. 1963), *aff'd per curiam*, 337 F.2d 857 (3d Cir. 1964). Where a plaintiff itself uses the patented process in manufacturing, damages for infringement may take the form of lost profits, and the burden is on the plaintiff to show their amount. *See Panduit Corp. v. Stahlin Brothers Fibre Works, Inc.*, 575 F.2d 1152,

1157, 1158 (6th Cir. 1978); *Zegers v. Zegers, Inc.*, 458 F.2d 726, 729 (7th Cir.), *cert. denied*, 409 U.S. 878 (1972); *Universal Athletic Sales Co. v. American Gym*, 480 F.Supp. 408, 413 (W.D. Pa. 1979). Where, as here, the party alleging infringement does not itself manufacture or use the patented process, compensation may take the form of a reasonable royalty for licensing the use of the patent. As with the manufacturing plaintiff, it is arguable that the licensing plaintiff has the burden of proposing a reasonable royalty. *See Wayne-Gossard Corp. v. Moretz Hosiery Mills, Inc.*, 447 F.Supp. 12, 15 (W.D.N.C. 1976), *aff'd per curiam*, 573 F.2d 191 (4th Cir. 1978). A rule that a nonmanufacturing plaintiff has no obligation to proffer a reasonable basis for calculating a royalty would be unfair to manufacturing plaintiffs and to the courts: the manufacturing plaintiff would have the "heavy burden," *Panduit Corp.*, 575 F.2d at 1158, of proving lost profits, while the non-manufacturing plaintiff would have no obligation to come forward with any evidence at all.

58. Even if there is no explicit burden on a plaintiff to adduce the basis for a reasonable royalty, it is self-evident that there must be enough evidence in the record to allow the fact finder to ascertain a reasonable royalty. In the absence of any evidence as to what would constitute a reasonable royalty in a given case, a fact finder would have no means of arriving at a reasonable royalty, and none could be awarded.

59. Plaintiffs argue here that they are entitled to a percentage of the savings which accrued to General Motors by reason of General Motors' infringement of the patent, and that the standard to which the infringing bumpers should be compared (the "standard of comparison") is the cost of producing bumpers by hot forging or by contour polishing after forming. Plaintiffs also contend that the burden shifted to General Motors to show that plaintiffs' proposed standard should not be used.

60. The Special Master and the trial court agreed that plaintiffs' proposed standard of comparison was not reasonable, because that standard of comparison required accepting the factual premise that General Motors could not efficiently cold form bumpers without the Devex process, a factual premise which the Special Master found to be false. Instead of ruling that plaintiffs had not adduced a reasonable standard of comparison and refusing to award damages on the ground that to do so would involve too much speculation, however, the Special Master awarded damages based upon an industry-wide licensing offer made by plaintiffs in 1964. The district court reversed the Special Master's action in reducing the .75% figure by one-third, but agreed with the Special Master's action in basing the award of royalties on the licensing offer. We agree with that approach, and affirm the award of damages of .75% of the sales price of infringing bumpers.

61. In *Pitcairn v. United States*, 547 F.2d 1106 (Ct. Cl. 1976), *cert. denied*, 434 U.S. 1051 (1978), the court awarded the owner of the patent a royalty based on an industry-wide offer to license made by the owner.[13] In *Pitcairn*, the patent owner had agreed with one licensee to a 2% royalty, and had offered to license anyone else at the 2% rate. The court rejected the owner's contentions that the 2% royalty agreement could not be taken into account because it "was mainly the product of compromise to avoid litigation" and that an offer by a patentee is inadmissible to prove value. *Id.* at 1116-17.

62. The court further gave the offer and the actual rate "a *prima facie* title to acceptance as the reasonable

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[13] *Pitcairn* involved 28 U.S.C. §1498, which is applied where the infringer is the United States. We agree with the Special Master that the fact that an award is made under §1498 instead of §284 does not preclude the application of the §1498 interest reasoning to a §284 case. The goals of §1498 and §284 are the same: to compensate fully the patent owner for the loss incurred by reason of the infringement.

royalty . . . ." *Id.* at 1118. The court rejected the infringer's contentions that the royalty should be less than 2%:

> For the present case, in which there was only one actual licensee during almost the entire span of the infringement years, and this suit began early in the recovery period, the best that we can do is to accept the only royalty rate "offered freely [by the owner] to everyone" in the industry during that period, a rate actually agreed to, for a time, by . . . the largest manufacturer.

Id. at 1119.

63. While there are factors which distinguish this case from *Pitcairn*, nonetheless *Pitcairn* supports reliance upon the .75% figure here. That plaintiffs here made their offer in the face of industry-wide infringement[14] is somewhat counterbalanced by the fact that plaintiffs, at the time of the offer, had just won a major validity victory in the Seventh Circuit. The .75% offer doubtless included an element of a desire to end this already extensive litigation; that factor, although to be taken into account, does not automatically rule out use of the .75% figure.

64. *In Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 612 F.2d 1353 (3d Cir.), *cert. denied*, 449 U.S. 827 (1980), the court stated that "the actual license rate is an important factor in the determination of a reasonable royalty, at least when those royalties prove or *tend* to prove an established royalty." *Id.* at 1358. The result reached here — that an actual license offer may, if the facts permit, be a factor in assessing a reasonable royalty — logically follows from *Trio Process*.

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[14] *See* Panduit Corp. v. Stahlin Brothers Fibre Works, Inc., 575 F.2d 1152, 1158 (6th Cir. 1978) (setting of reasonable royalty after infringement is not the equivalent of negotiations between "truly 'willing' " patent owners and licensees).

65. In short, plaintiffs' proposed royalty rate was based on an incorrect factual premise. There was, however evidence in the record justifying the Special Master's basic reliance on the .75% figure. Accordingly, we rule that the .75% rate assessed by the district court was appropriate here.[15]

2. *Non-bumpers*

66. The Special Master and the trial court refused to award plaintiffs damages for infringement in non-bumper cold forming because plaintiffs failed to adduce a reasonable standard of comparison upon which to premise such an award and because the Devex patent was relatively unimportant in non-bumper making. Plaintiffs' proposed standard of comparison suffered from the same infirmities as the proposed standard for bumper making: it was based on a factual assertion (that the parts could not be cold formed without the Devex process) which the Special Master found, as a matter of fact, to be incorrect. We affirm the rejection of plaintiffs' proposed standard of comparison, because the facts foreclose the use of that proposed standard.

67. Plaintiffs make an additional argument with regard to non-bumpers: the statute provides that the court "shall" award damages in an amount not less than a reasonable royalty, and that the award of no damages does not comply with the statute. We reject this contention. The statute requires the award of a reasonable royalty, but to argue that this requirement exists even in the absence of any evidence from which a court may derive a

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[15] Plaintiffs' proposed royalty was premised on an assertion that was found to be false. There was evidence in the record supporting an alternative amount, however. We need not, therefore, reach the issue of whether plaintiffs had or met any applicable burden of proof with regard to bumper royalties. Nor do we reach the question of when the burden to refute a proposed royalty shifts to the infringer, or what the shifted burden entails.

reasonable royalty goes beyond the possible meaning of the statute. Even if there is no burden of proof on the party seeking damages in this type of case to come forward with a reasonable royalty, there must at the least be enough evidence in the record to allow the factfinder to formulate a royalty. Here, plaintiffs' proposed standard was vitiated by the facts, and there was insufficient evidence in the record upon which the fact finder could rely in formulating an alternative. There was no non-bumper industry-wide offer for the court and Special Master to use in arriving at a reasonable royalty. Thus, plaintiffs are not entitled to collect any royalty for non-bumper infringement.[16]

3. *Interest*

68. The Special Master, affirmed by the district court, awarded interest (delay damages) at the prevailing corporate bond rate on the royalty payments as of the date those payments became due, calculated yearly (number of infringing parts made each year). On appeal, defendant contends that such an award was improper. We disagree, and hold that under the facts of this case the award of interest as the yearly royalty payments became due was not an abuse of discretion.

69. Title 35 U.S.C. §284 provides that an award for infringement shall be "in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court." The language of the statute does not indicate as

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[16] Even if plaintiffs were entitled to a royalty — which they are not — on non-bumper parts, that royalty would be minimal, given the Special Master's fact findings on the ready interchangeability of the Devex and other processes in non-bumper making.

Because we conclude that plaintiffs are not entitled to any damages for non-bumper infringement, we need not reach the question of whether accused practices 1 and 8 infringed the Devex patent; accused practices 1 and 3 were both non-bumper processes. Appendix at 523, 557.

of when interest, if awarded, shall be calculated. We are not, however, entirely without guidance on this question. In *Aro Manufacturing Co. v. Convertible Top Co.*, 377 U.S. 476 (1964), the Supreme Court examined the 1946 amendment to 35 U.S.C. §284, pursuant to which a claimant became entitled to recover damages instead of damages plus profits:

> The purpose of the change was precisely to eliminate the recovery of profits as such and allow recovery of damages only.
>
>> "The object of the bill is to make the basis of recovery in patent-infringement suits general damages, that is, any damages the complainant can prove, not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages." H.R. Rep. No. 1587 79th Cong., 2nd Sess. (1946), to accompany H.R. 5311, at 1-2; S.Rep. No. 1503, 79th Cong., 2d Sess. (1946), to accompany H.R. 5311 at 2.

377 U.S. at 505-06 (footnote omitted). Thus, in *Aro* the Supreme Court identified the purpose of the amendment, and stated that it was part of that purpose that damages in the amount of a reasonable royalty plus interest "from the time infringement occurred" be recoverable.

70. Moreover, in a case such as this one, 35 U.S.C. §284 itself supports the award of interest from the date of infringement. Section 284 requires that the damages be "adequate to compensate for the infringement." The complaint in this case was filed in 1956, and the Special Master awarded damages to plaintiffs for infringement which took place in that year. To do otherwise than award interest from 1956 would give defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs, and would deprive plaintiffs of

money they should have had. Moreover, a failure to award interest as of the date of infringement would encourage defendants to draw out litigation for as long a period as possible. The only sufferer from such a result would be the *prevailing* plaintiff — the innocent party.[17]

71. Nor does the award of interest from the date of infringement require appreciably more effort from those masters or judges with the responsibility of setting the amount due than that which would be expended in any event. Here, the master and trial court labored long and hard to ascertain the extent of the infringement and the amount of royalties due. The award of yearly interest did not add appreciably to this herculean task. The number of bumpers produced by infringing processes per year emerged in this case in connection with establishing exactly which accused practices infringed and the viability of alternatives to infringing practices (which necessitated examining what percentage of the bumpers formed each year were formed with infringing processes). Once the royalty rate was set, the award of interest became relatively simple.[18]

72. The award of interest from the year of infringement is consistent with *Trio Process,* where this court awarded "interest from the date of infringement, and costs" to the owner of the patent. 612 F.2d at 1361. *See also Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 638 F.2d 661, 662 (3d Cir. 1981) (opinion on motion for clarification of mandate). While there was an established license rate in *Trio Process,* we decline to rule that the absence of such a rate precludes an award of in-

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[17] Moreover, where, as here, the interest is as much as or more than the royalties, a failure to award interest from the date of the infringement would mean that the losing defendant actually gains from the infringement and the lengthy litigation.

[18] Defendant does not object to the method used to calculate the interest nor to the rate, but only to the fact that it was awarded at all.

terest on the facts of this case. Especially where, as here, interest from the date of infringement can be readily calculated, it follows from *Trio Process* and from the purpose of the statute that interest should be calculated from the date of infringement. Policy likewise dictates this result: failure in a case like this one to award interest as of the date of infringement rewards infringers where those infringers have refused to accept or negotiate a royalty, and discourages the amicable licensing of patents.

73. This result is also consistent with *Hartford National Bank & Trust Co. v. E.F. Drew & Co., Inc.*, 188 F.Supp. 347 (D.Del. 1960), *aff'd per curiam*, 290 F.2d 589 (3d Cir.), *cert. denied*, 368 U.S. 825 (1961), in which the court, prior to *Aro*, awarded interest "from the end of each calendar year in which defendant's sales were made." 188 F.Supp. at 349. In addition, *see Marvel Specialty Co. v. Bell Hosiery Mills, Inc.*, 386 F.2d 287 (4th Cir. 1967), *cert. denied*, 380 U.S. 1030 (1968), in which the court awarded interest on the royalties from the date those royalties had become payable. The royalties in that case were, however, as in *Trio Process*, based on an established rate at which the injured party had granted actual licenses.

74. In *Pitcairn v. United States*, 547 F.2d at 1120-24, the court awarded delay damages "computed on a calendar year basis with interest starting on January 1 of each year on the royalties accrued during the preceding calendar year." *Id.* at 1121.[19] Such an award was necessary to " 'accomplish complete justice as between plaintiff and the United States.' " *Id.* at 1120, *quoting Waite v. U.S.*, 282 U.S. 508, 509 (1931). The court in *Pitcairn* used Moody's Composite Index of Yields on Long Term Corporate Bonds to set the delay

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[19] Delay damages would continue to accrue until "the date of payment of the court's judgment herein." 547 F.2d at 1120.

damage ("interest") rate on the unpaid royalties. 547 F.2d at 1121.

75. We see no reason to rule that §284 does not allow an award of interest, or "delay damages," from the date of infringement in the face of the *Pitcairn* rule that §1498 allows such an award. Sections 1498 and 284 mandate doing justice to the party whose patent has been infringed. The failure to award interest to plaintiffs here would penalize the prevailing party and reward the infringer for its wrongdoing, and we decline to reach such an inequitable result, one which, moreover, would be inconsistent with Third Circuit precedent as well as with the applicable statute.

76. The result reached here is inconsistent with that reached in *Wahl v. Carrier Manufacturing Co.*, 511 F.2d 209 (7th Cir. 1975), where the court ruled that "interest should run from the date damages are liquidated." 511 F.2d at 215. The result reached here is not, however, necessarily inconsistent with that reached in *Georgia-Pacific Corp. v. U.S. Plywood Champion Papers Inc.*, 446 F.2d 295, 301 & n.7 (2d Cir.), *cert. denied*, 404 U.S. 870 (1971), where the court rejected the argument that *Aro's* quotation of H.R. Rep. No. 1587 constituted an adoption of the rule that interest should run from the date of infringement. In *Georgia-Pacific*, the court ruled that the award of interest is discretionary with the trial court, and that the trial court had the discretion to award interest as of the date of the last infringement. The court did not rule, however, that it would be an abuse of discretion to award interest as of the date of infringement. *But see Milgo Electronic Corp. v. United Business Communications, Inc.*, 623 F.2d 645, 667-68 (10th Cir.), *cert. denied*, 447 U.S. 928 (1980) (in patent cases the normal rule that interest only begins to run after the damages are liquidated is extended to allow the trial judge the discretion to award interest from the date of last infringement).

77. For the foregoing reasons we affirm the judgment of the District Court.[20]

A True Copy:

Teste:

Clerk of the United States Court of Appeals
for the Third Circuit

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[20] We affirm the award of costs (including the Special Master's fee) against defendant. We also affirm the district court (and Special Master's) ruling that an award of multiple damages and attorney's fees would not be appropriate in this case.

UNITED STATES COURT OF APPEALS

For The Third Circuit

Nos. 80-2550/80-2551

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. Te GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE Te GROTENHUIS, WILLIAM C. McCOY, JR., and KATHERINE M. BASSETT

vs.

GENERAL MOTORS CORPORATION

Devex Corporation, Technograph, Inc., William C. McCoy, Jr., individually and as Executor of the Estate of William C. McCoy, deceased, Theodore A. Te Grotenhuis, Frederick B. Ziesenheim, Marjorie Te Grotenhuis, and Katherine M. Bassett,

Appellants in No. 80-2550

General Motors Corporation,

Appellant in No. 80-2551

(D.C. Civil No. 3058)

ON APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

Present: GIBBONS and HUNTER, *Circuit Judges* and
STERN, *District Judge*[*]

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[*] Honorable Herbert J. Stern, United States District Judge for the District of New Jersey, sitting by designation.

JUDGMENT

This cause came on to be heard on the record from the United States District Court for the District of Delaware and was argued by counsel on September 18, 1981.

On consideration whereof, it is now here ordered and adjudged by this Court that the judgment of the said District Court, entered October 6, 1980, be, and the same is hereby affirmed. Costs taxed against appellants in each appeal.

ATTEST:

Sally Mrvos
Clerk

December 15, 1981

UNITED STATES COURT OF APPEALS

For the Third Circuit

Nos. 80-2550 and 80-2551

DEVEX CORPORATION, et al.,
Plaintiffs-Appellants, Cross-Appellees

v.

GENERAL MOTORS CORPORATION,
Defendant-Appellee, Cross-Appellant

SUR PETITION FOR REHEARING

Present: ALDISERT, GIBBONS, HUNTER, WEIS,
GARTH and SLOVITER, *Circuit Judges*

The petition for rehearing filed by
Defendant-Appellee, Cross-Appellant

in the above entitled case having been submitted to the judges who participated in the decision of this court and to all the other available circuit judges of the circuit in regular active service, and no judge who concurred in the decision having asked for rehearing, and a majority of the circuit judges of the circuit in regular active service not having voted for rehearing by the court in banc, the petition for rehearing is denied.

By the Court,
/s/ James Hunter, III, Judge

Dated: January 13, 1982

UNITED STATES COURT OF APPEALS

For the Third Circuit

Nos. 80-2550

DEVEX CORPORATION, et al.,
Plaintiffs-Appellants, Cross-Appellees
v.
GENERAL MOTORS CORPORATION,
Defendant-Appellee, Cross-Appellant

SUR PETITION FOR REHEARING

Present: GIBBONS and HUNTER, *Circuit Judges*, and
STERN,* *District Judge*

The petition for rehearing filed by
Plaintiff-Appellants, Cross-Appellees

in the above entitled case having been submitted to the judges who participated in the decision of this court and no judge who concurred in the decision having asked for rehearing, the petition for rehearing is denied.

By the Court,
/s/ James Hunter, III, Judge

Dated: January 13, 1982

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* Honorable Herbert J. Stern, United States District Judge for the District of New Jersey, sitting by designation.

Joint Appendix

2

No. 81-1661

In the Supreme Court of the United States

OCTOBER TERM, 1982

General Motors Corporation,
Petitioner,

vs.

Devex Corporation, et al.,
Respondents.

Office-Supreme Court, U.S.
FILED
JUL 10 1982
ALEXANDER L. STEVAS,
CLERK

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

JOINT APPENDIX — VOLUME II

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(Continued on inside front cover)

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Appendix

In the United States District Court For the Northern District of Illinois

Civil Action 56C 1912

Devex Corporation et al.,
Plaintiffs,

v.

General Motors Corporation et al.,
Defendants.

RELEVANT DOCKET ENTRIES

Date	
11/13/56	Filed complt. & 2 copies.
7/8/57	Fld answers of deft General Motors Corp. to Plaintiffs interrogatories of March 5, 1957
7/16/57	Fld answer of deft Gen. Motors Corp.
2/4/59	Filed Motion to Consolidate and Brief in Support of Motion
11/19/59	Enter order consolidating actions for trial on issue of validity only. (Draft) (2)-Robson, J. Mld ntcs 11/23/59.
1/24/61	Filed answers of deft General Motors Corp. to pltffs further interrogs. dated Jan. 6, 1961
1/30/61	Cause called for trial on the issue of validity opening statement made by pltff. Evidence heard in part for pltff. Order cause adjourned until Jan. 31, 1961-Robson, J. Mld. Ntcs. 2/1/61.
1/31/61	Further evid hrd for pltff. Order cs adjourned until Feb. 1, 1961-Robson, J.
2/1/61	Further evid hrd for pltff. Pltff rests. Order cause until Feb. 3, 1961-Robson, J. Mld. ntcs. 2-3-61.
2/2/61	Evid hrd in part for defts. Order cs adjourned until Feb. 3, 1961-Robson, J.
2/6/61	Further evid hrd for defts. Defts rest. Rebuttal evid. hrd for pltff. Pltff rests. Surrebuttal evid hrd for defts. Defts rest. Both sides rest. Order cause taken under advmt. on the issue of validity within both sides to submit suggested findings of fact and conclusions of law and file briefs in support thereof simultaneously by March 20, and reply to suggested Findings etc. and brief in

Date	
	opposition by April 20, 1961. Robson, J. Mld. Ntcs. 2-8-61.
2/1/62	Filed Decision on Merits on Validity of Claim 4 of Reissue No.24,017.
6/29/62	Filed Affidavit and Exhibit A and Motions of pltffs to amend findings of fact and to grant a new trial.
6/29/62	Enter Findings of Fact and Conclusions of Law (Draft).
6/29/62	Enter additional Findings of Fact (Draft).
6/29/62	Enter final judgment finding certain claim invalid and void with complt in 56 C 1912 and 57 C 892 dismissed upon the merits with prejudice with defts to recoar costs-Robert, J. Mld. Ntcs. 7-2-62.
7/13/62	Enter order denying motions of pltffs to amend findings of fact & to grant a new trial. Robson, J. Mld. ntcs 7/16/62.
8/10/62	Filed Notice of Appeal of Plaintiffs.
8/13/62	Filed Cost bond on appeal.
10/31/62	Clerk's file copy of transcript of proceedings had before Hon. Edwin A. Robson, Judge, on January 30, 31, February 1, 2, 3 and 6, 1961 (9 volumes).
11/8/62	Transmitted record [I-218] on Appeal to the United States Court of Appeals for the Seventh Circuit. Transcript of Proceedings, Depositions, and Exhibits under separate certificate. $13.70 Paid.
1/17/64	Record returned from United States Court of Appeals for the Seventh Circuit (Transcript, Depositions and Exhibits).
1/17/64	Filed Opinion [of] United States Court of Appeals for the Seventh Circuit.

Date	
1/17/64	Filed Mandate [of] United States Court of Appeals for the Seventh Circuit judgment of the District Court entered June 29, 1962 is reversed with costs and remanded.
1/14/65	Enter[ed] order holding certain claim [4 of Patent No. Re. 24,017] valid; awarding $1640.68 costs to plaintiffs; setting briefing schedule on plaintiffs' motion for summary judgment vs. Houdaille [57 C 892]; setting said motion for disposition on March 2, 1965; granting until January 15, 1965 time for plaintiffs to serve interrogatories on question of venue, with defendants to respond or object by February 5, 1965; and setting cause on February 10, 1965 for status reports and scheduling briefs on question of venue — Draft. Enter[ed] order vacating order of November 19, 1959 consolidating causes and order[ing] proceedings hereafter [be] conducted separately — Draft Robson, J. Mailed notices 1-15-65.
4/21/65	Filed plaintiffs' Motion to transfer as to General Motors Corp., to United States District Court [for the District] of Delaware [and memorandum in support thereof].
5/21/65	Filed memorandum of Defendant, General Motors Corp., in support of its Motion to dismiss and relative to plaintiffs' Motion to transfer.
5/25/65	Filed Defendant's Notice and Motion of General Motors Corporation to Dismiss.
6/4/65	Filed plaintiffs' memorandum in reply to General Motors' Motion to Dismiss.
7/2/65	Arguments heard and concluded on motions of defendant, General Motors Corp., to modify

Date	
	order to permit interlocutory appeal and to stay transfer, and order both motions denied — Robson, J. Mailed notices 7-6-65. [Transcript of proceedings before Judge Robson on July 2, 1965.]

In the United States District Court
For the District of Delaware

Civil Action 3058
Devex Corporation et al.,
Plaintiffs,

v.

General Motors Corporation,
Defendant.

7/21/65	Cerfd copy of Order from U.S. Dist. Ct. N dist Ill E Div together w/all papers in said case recvd transferring cause to U.S. Dist Ct Dist of Delaware as to deft Genl Mtrs.
1/16/67	Opinion Wright Ch.J.on plaintiff's motion for summary judgment. Formal order to be submitted by counsel (Notice to Counsel)
2/3/67	Order Wright J. That the decision of the Court of Appeals for the Seventh Circuit holding Hendricks Patent No. Re.24,017 good and valid in law is binding on defendant, General Motors Corporation, and the law of the case; and the motion for summary judgment on infringement is denied for the reasons set out in the opinion.
7/17/68	ORDER WRIGHT J (with AMENDED COMPLAINT attached) giving pltfs leave to file the amended complaint; holding decision of

Date	
	Ct of Appeals 7th Cir holding Henricks Patent Re.24017 good and valid in law does not estop pltfs from asserting equivalents re Claim 4 to extent set out in Memo Opinion of May 23, 1968; further ordered that discovery as to deft's processes shall be subject to limitations set forth by the opinion, and that pltfs motion for leave to file a supplemental complaint is not ruled upon, the matter now being moot (Notice to counsel)
8/19/68	Answer of Deft to Amended Complaint.
9/24/68	Hearing Wright Ch J. Decision Deft's motions to set CA 3058 for pretrial and trial granted; deft's motion to stay CA 3545 denied; pltf's motion for consolidation denied; counsel to agree on dates for pretrial prior to Dec 31 1968 and trial in Jan or Feb 1969.
11/12/69	PRETRIAL ORDER
11/13/69	TRIAL TO THE COURT WRIGHT J. Nov. 13-14-17-18-19-20-21-24-25-26 Dec. 1-2-3-4-5-8-9-10-11-(NINETEEN DAYS)
9/8/70	OPINION, Findings of Fact and Conclusions of Law, Wright, J. Formal order to be submitted by counsel. (Notice and copies to counsel.)
12/16/70	Memorandum Opinion Wright J. on pl's motion re fact findings. Order to be submitted by counsel (Notice and copies to counsel).
1/12/71	ORDER Wright J. amending Pretrial Order and Finding of Fact 8A(8) of Court's Sept 8'70 opinion and denying pltifs' motion to make additional findings of fact.
1/13/71	FINAL JUDGMENT WRIGHT J.1. That deft has not infringed Claim 4 of patent, etc.; 2. That the Amended Complaint is dismissed with prejudice; 3. That deft recover its taxable costs

Date	
	on the infringement issues in this action; 4. That the interlocutory order of Feb 3 1967 of this Court decreeing that the decision of the Court of Appeals for the 7th circuit holding Henricks patent No. Re 24.017 good and valid in law is binding on deft and the law of the case, is hereby made final and a part of the Final Judgment (Notice to Counsel)
1/25/71	Notice of Appeal by pltfs
2/10/71	Notice of appeal by defendant. (Notice and copy to Clk 3rd CCA and counsel).
4/16/71	Exit record on appeal to 3rd CCA (Notice to Clk 3rd CCA and counsel)
2/27/73	Certified copy of JUDGMENT, 3rd CCA that the judgment of the District Court filed Jan. 13 '71 is REVERSED as to that portion which held that deft had not infringed Claim 4 of Reissue Patent No.24,017, which holding is the subject of the principal appeal herein at our No. 71-1344; as to that portion of the said judgment which held that the decision of the Court of Appeals for the 7th Circuit sustaining the Henricks patent as valid in a stated limited context was binding upon GM, it is further ordered that said portion of said judgment is AFFIRMED. Costs taxed in favor of Devex et al., appellants in No. 71-1344 and appellee in 71-1345
1/29/74	COPY OF STIPULATION AND ORDER WRIGHT J. dismissing Civil Action 3545 and transferring all pleadings and documents from C.A. 3545 to become part of the Court file in C.A. 3058, and may be used by the parties in Civil Action 3058 for all purposes with full force and effect as if originally filed in Civil Action

Date	
	3058. Documents numbered 182-1 through 182-33.
1/29/74	#182-1 Complaint from C.A. 3545 filed May 21 1968, #182-3 Summons issued May 21'68 in C.A. 3545 and Marshal's return, #182-4 Amended complaint from C.A. 3545, #182-22 from C.A. 3545 filed Oct 21'68 deft's answer to amended complaint
3/15/74	ORDER Wright, J. referring matter to Bruce M. Stargatt Esq. Special Master pursuant to Rule 53.
4/4/74	Pltfs answers to defts accounting interrogatories
4/22/77	Pltfs' Supp. answers to interrogs. A-19(1) and A-19(10)
5/27/77	Pltfs' Second Set of Supp. answers to defts interrogs. OB-1 and OB-2
4/7/78	Stipln. re compensation ultimately awarded Special Master for services in proceed.
2/7/80	Special Master's report SEALED (notice to counsel by Clerk)
3/26/80	Petition by Special Master for award of fee and allowance w/affidav. of Bruce M. Stargatt
4/14/80	Stipln. And ORDER Wright J. granting Special Master's petition for fee and allowance in amt. $176,510.35. (notice to Stargatt, counsel)
4/21/80	Deft's. exceptions to Report of Special Master., Deft's. brief re exceptions to Report of Special Master., Deft's. principal docs. on accounting., Pltfs'. motion for modification of Report of Special Master., Pltfs'. exceptions to Report of Special Master., Pltfs'. brief in support of exceptions to Report 2/7/80 and motion for modification

Date	
5/22/80	Pltfs'. answering brief re exceptions to Special Master's Report.
5/22/80	Deft's. response to pltfs'. brief re exceptions to Report of Special Master.
6/18/80	Deft's reply brief., Pltfs'. reply brief re exceptions to report Special Master.
8/22/80	OPINION Wright J. (notice and copies to counsel; notice and copy to Stargatt by court)
10/6/80	Stipln. and ORDER Wright J. that method calculating amt. royalty and prejdgmnt int. in final judgmnt set forth in att. letter 9/25/80. (notice to counsel) Final Judgment and ORDER Wright J. adopting certain Special Master's finding and recommendation, rejecting certain findings and recommendations; deft. shall pay pltfs. $19,726,236.55 plus prejdgmnt int $3,071.22 each day after 8/31/80 up to and including date of entry of this judgmnt; plus postjdgmnt int. at rate allowed by State Law. (notice and copies to counsel and Special Master Stargatt by Court)
10/6/80	Notice of APPEAL filed by deft. 4:26 p.m. (notice and copies to Clerk 3rd CCA and Anderson)
10/20/80	Letter Wright J. dated 10/6/80 notice entering jdgmnt as submitted by GM. Letter Wright J. amending reference to jdgmnt order as submitted by GM to read "amendment to Subsection (a), Section 2301, Chapter 23, Title 6, Delaware Code, as amended by House Bill 845, Section 7 thereof, and as further amended by Sec. 1 Senate Bill #519.
10/22/80	Exit record on appeal to Clk. 3dCCA. Notice to Counsel.

Plaintiff's validity trial exhibit number 1

1

24,017

METHOD OF COATING AND DRAWING METAL AND COMPOSITION THEREFOR

John A. Henricks, Lakewood, Ohio

No Drawing. Original No. 2,588,234, dated March 4, 1952, Serial No. 193,290, October 31, 1950. Application for reissue March 1, 1954, Serial No. 413,490

21 Claims. (Cl. 148—6.15)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This application is a continuation-in-part of my copending application Serial No. 665,905 filed April 29, 1946, *now abandoned*. The invention relates to the lubrication of sliding metal surfaces. In particular, it relates to the treatment and lubrication of surfaces under conditions of extreme pressure and surface temperature as encountered in the drawing and deforming of metals such as steel.

Ordinary lubricating oils fail to give satisfactory performance characteristics in the drawing and deforming of harder metals such as steel with the result that tearing of the metal or galling of the dies frequently occurs. Even extreme pressure lubricating oils are unsatisfactory for this purpose and are not recommended. The accepted theory is that the failure of such lubricants is due to a squeezing-out of the lubricants from between the work and die because of the extreme pressure used. Accordingly, to counteract this extreme pressure and to prevent the squeezing-out of lubricants, it has been the general practice to utilize as drawing compositions lubricants containing infusible pigments such as clay, lime, mica, calcium or magnesium carbonates, titanium dioxide and graphite. The function of such pigment is to separate the die and the workpiece at points of extreme deformation and intimate contact when the pressure or temperature is too great to be withstood by the organic constituents of the lubricating material. While such compositions do function better than the prior non-pigmented materials, an examination of the work drawn with the aid of such drawing compositions discloses minute particles of pigments embedded therein and a surface with an undesirable dull finish.

An additional objection to infusible pigment fillers is their abrasive or lapping action which increases friction and oil temperatures during the drawing operation.

It has been established (Bowden and Ridler in Proceedings of the Royal Society 154,640; 1936) that in sliding friction between dry metallic surfaces the frictional junction reaches and maintains the melting point of the lower melting metal. This readily explains the galling of dies and the welding and seizure of moving parts. From this it can be seen that the failure of a drawing lubricant may well be caused by high temperature destruction or carbonization of the lubricant with the resultant galling and seizure instead of pressure squeezing-out the material from the working surfaces as previously believed.

From this it follows that for the most satisfactory drawing and working of metal, effective lubrication throughout the entire temperature range below the melting point of the work or die is desirable. Furthermore, neither the drawing lubricant nor the surface of the metal should contain any solids capable of scratching the surface of the metal.

An object of the present invention is to provide a method of drawing metal wherein the metal is lubricated throughout all temperatures below its welding point so that relatively smooth working of the metal is facilitated and there is no galling, seizing, or scratching of the metal or die and a smooth shiny surface is produced on the metal.

A further object of the present invention is to utilize a drawing lubricant containing ingredients which function to provide lubricating and cooling properties throughout the different temperature ranges by their ability to melt and flow under frictional heat and to provide a method of drawing metal whereby the workpiece and die are subjected to a stepwise lubricating action of materials which function to give optimum lubricating properties throughout the different temperatures.

Another object is to provide a process of drawing and forming metal wherein a smooth finish is obtained on the drawn article and wherein the residual fusible integral film on the metal forms a desirable base for paint or enamel coatings so that the drawn article may be painted without the necessity of first cleaning the surfaces thereof or so that the fusible lubricant coating acts as a prime coating to provide superior adhesion of subsequent paint or lacquer films.

In accordance with the present invention, I form an integral meltable film directly on the surface of the workpiece. and coat this with a suitable organic binder through which is disposed pigments of distributed melting points. The integral coating formed on the surface of the work and the pigments in the binder are of materials having a hardness less than 5 on Mohs' scale and melting at temperatures below that of the die or the workpiece, whichever melts at the lower temperature. Likewise, the organic binder melts or decomposes at temperatures below that of the fusion of the fusible pigments. The melting points of the integral coating, organic binder, and incorporated solids are determined and arranged or graduated so that they melt in successive temperature ranges and there is a plastic lubricant btween the die and workpiece at all temperatures and stepwise lubrication is achieved.

The process thus embraces three basic, co-acting factors. In the first place, there is an integral coating formed directly upon the work. In the second place, an organic binder is disposed over the work. And thirdly, meltable pigments are dispersed in the organic binder to further lubricate and facilitate drawing and deformation of the work. In this way, the work is lubricated and protected throughout the drawing or forming process and superior draws are made possible.

Various materials and processes can be used to form the coating directly on the work surface and several resultant coatings can be employed. The qualifications of the integral coating or fixed film are that it must have a hardness less than 5 on Mohs' scale and that it will be plastic at temperatures below that at which the work or die welds.

INTEGRAL COATINGS

The formation of integral coatings on ferrous metals is brought about by an unusual electrochemical phenomenon. The usual corrosion of metals involves a well understood galvanic action between local cells or couples on the metal surface in which specific areas of the metal become anodic because of differences in chemical composition, intergranular strain, or local oxygen concentration, and iron goes into solution and the equivalent hydrogen ions are discharged at the less reactive cathodic areas.

The formation of tarnish films and integral coatings on polyvalent metals involves the Wagner electrolytic theory. C. Wagner studied this phenomenon and proposed an explanation reported in the transactions of the Faraday Society 34,851 (1938) and elsewhere. Unlike the local galvanic cells existing in the usual corrosion of metals, the corrosion produce or tarnish film is built up by a mechanism wherein the metal-to-film interface becomes the anode and supplies cations and electrons for outward diffusion, and the attacking film substance-to-environment interface becomes the cathode and supplies anions for inward diffusion. The growing film thus acts as both the internal and external circuits of a closed cell. The internal cell circuit is made possible by the insoluble iron compounds acting as a semi-conductor, while the conducting electrolyte in the film pores and capillaries furnishes an external circuit. The Wagner tarnish mechanism requires an attack by a diacidic metallic precipitating reagent in order to form the semi-conducting metallic component of the internal circuit. Thus, when the polyvalent metal is ferrous, the integral coating will always contain iron salts. The cathodic film-to-solution interface contains the discharging hydrogen, so that any depolarizer in the solution effectively accelerates the coating action.

The principal object of this invention is to utilize the Wagner mechanism to convert an otherwise refractory metal surface into an integral film of suitable compounds that will absorb and tenaciously hold a thermoplastic lubricant film containing other fusible pigments.

When such a film is to be formed in aqueous media, the diacidic precipitating reagent can be selected from the difluorides, the various dihydrogen phosphates, the dicarboxylic organic acids, and the diabasic inorganic sulfur containing acids ranging from hydrogen sulfide through sulfoxylic to the various polythionic acids.

Tarnish films of mixed oxides are also formed in the gaseous phase by the Wagner mechanism but I prefer to form sulfide layers, because of their fusibility.

Another modification of Wagner film formation involves the use of molten salts containing active sulfur which also produces fusible iron sulfide layers on ferrous metals that can be used as a lubricant undercoat.

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IRON SULFIDE COATINGS

The most versatile lubricant base integral coating is that consisting principally of iron sulfide since it can be applied in either aqueous, gaseous, or molten salt media.

When ferrous metals are to be coated with a fusible integral iron sulfide film in aqueous media, I utilize an acidic solution containing colloidal sulfur, sulfur dioxide, and a mixture of polythionic acids. Such a solution can be prepared by the acid decomposition of unstable inorganic sulfur compounds by any of the following methods:

1. Sodium thiosulfate or sodium polythionates decomposed by preferred dibasic acids which are also coating agents.
2. Decomposition of equimolar H_2S and SO_2 in aqueous acid solution to give Wackenroder's solution.
3. Hydrolysis of sulfur mono-chloride emulsified in a dibasic acid solution to form polythionic acids.
4. Interaction of wettable sulfur and sulfur dioxide in a solution containing a dibasic coating acid.

Integral ferrous sulfide films can also be formed on "sull" or iron hydroxide coated ferrous metal by converting the hydrated iron oxide film to iron sulfide by dipping in a hot aqueous alkaline polysulfide solution.

When ferrous metals are filmed with a layer of sodium thiosulfate or an equivalent decomposable sulfur salt, the metal can be coated with an integral coating of iron sulfide by heating the filmed metal above the initial melting point of the hydrated salts which melt in their water of crystallization. Likewise, a molten salt bath containing active sulfur can be utilized. When ferrous metals are to be coated with a sulfide coating in gaseous media, a reducing atmosphere containing sulfur vapor is used and either the bare iron surface is filmed with iron sulfide or the hot mill scale on the metal surface from previous operations can be converted to iron sulfide to act as a lubricant undercoat using a sulfur or phosphorus halide catalyst if required.

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INTEGRAL PHOSPHATE AND OXALATE COATINGS

Two types of phosphate coatings are utilized as lubricant bases in metal drawing and cold extrusion. The first type is a light coating of about 25 to 150 mg. per sq. ft. formed by treating steel surfaces in a hot aerated or accelerated aqueous solution of 1 to 5 per cent sodium or ammonium dihydrogen phosphate. The second type is a heavy coating of about 200 to 1000 mg. per sq. ft. of mixed zinc and iron phosphates formed by treatment of steel surfaces in hot aqueous acidulated 1 to 5 per cent zinc dihydrogen phosphate accelerated by a strong oxidizing agent such as chlorate, persulfate, hydrogen peroxide, or a mixture of nitrate and nitrite. The phosphate coatings from these baths are heavier because free acid is consumed by the iron surface acting as anode in the Wagner mechanism so that zinc phosphate precipitates upon the work along with the iron phosphate formed by the neutralization of the free acid essential to zinc phosphate solubility. The amount of iron dissolved as anode in a zinc dihydrogen phosphate bath has been reported by Murphy and Streicher who showed (Proceedings Amer. Electroplaters Soc., p. 288; 1948) that an average phosphate coating from a zinc phosphate bath had a coating thickness of 0.055 mm. which represented an etched depth of 0.050 mm. and a dimensional increase of only 0.005 mm.

When a phosphate undercoat is desired as a component of my stepwise lubricant film, I can use any of the various proprietary coating baths in the patent literature such as those of Tanner and Lodeesen U. S. Patent No. 1,911,726, or Romig Patent No. 2,132,439; or I can use certain novel baths using Roussin's salts or nitrosyl chloride as the accelerator; or a novel bath of immersion copper plate codeposited with iron phosphate which acts both as a galvanic accelerator and a low frictional surface component.

Similarly, the proprietary oxalate coating baths such as that of Curtin and Kline U. S. Patent No. 1,895,568 or of Tanner U. S. Patent No. 1,911,537 can be used to obtain an integral oxalate coating as a component of a stepwise lubricant film. A novel method of obtaining an integral oxalate is to thermally decompose an aqueous layer of ferric oxalate, calcium chloride and oxalic acid upon the work to form an insoluble film of mixed calcium and ferrous oxalates.

When an oxalate undercoating is used as a component of a stepwise lubricant, it is most desirable to convert the film to a more fusible form by dipping the coating in a hot alkaline aqueous solution of a sulfide, borate, or phosphate to convert iron oxalate to a fusible iron borate, sulfide, or phosphate and to a meltable sodium oxalate which in turn is thermally decomposed to fusible sodium formate and sodium carbonate under frictional heat.

The various methods of converting a refractory ferrous metal surface to a fusible iron compound which will imbibe and anchor a stepwise lubricant composition is illustrated in the following examples:

A sulfide coating bath for stainless steel was made up as follows:

EXAMPLE I.—SULFIDE COATING ON STAINLESS STEEL

	Molar	Wt. Oz. Per Gal.
Iron chloride ($FeCl_3H_2O$)	0.3	5.0
Fluoboric acid (50% HBF_4)	0.3	6.0
Sodium thiosulfate ($Na_2S_2O_3.5H_2O$)	0.05	1

The sodium thiosulfate was added to the aqueous bath after it was made up, and it was converted to polythionic acids, sulfur dioxide and colloidal sulfur in equilibrium, to make a sulfide coating bath. Various other additions would produce the same polythionic acid equilibrium that is required for an iron sulfide coating bath, but the thiosulfate addition has the advantage of convenience.

The stainless steel coating bath is heated to between 115° F. and 135° F. a lift of previously pickled 18–8 stainless steel tubes were immersed in the bath for six minutes, and removed to drain the points of the tubes to assure inside diameter coating, and the tubes again immersed in the solution for six more minutes to complete the coating operation. The lift of tubes were again drained, and then rinsed in warm running water. The tubes were then hot rinsed in a 4 oz. per gal. solution of lime sulfur at 180° F. to neutralize and sulfurize any residues in the coating. The stainless steel tubes had a soft black sulfide coating. These sulfide coated tubes were then lubricated with the drawing composition shown in Example XIII, after which they were dried and successfully drawn to a 38 per cent reduction at a speed of 50 feet per minute to produce a bright unscratched surface.

VAPOR PHASE SULFURIZING

Vapor phase or gas-sulfurizing reaction can also be used to coat the metal with a sulfide film. The reaction is carried out by subjecting the work to sulfur or sulfur containing compounds in a heated reducing or non-oxidizing (inert) atmosphere. The sulfur can be applied as a coating before heating the work, or bled into the reducing atmosphere from a separate vapor generator. Hydrogen, hydrocarbon gases, carbon monoxide, ammonia or the oil vapors or other vapors commonly used for reducing atmospheres in the bright annealing of ferrous metals are satisfactory ,as reducing atmospheres during the reaction between sulfur and the ferrous metal. The attack of iron by sulfur begins at about 400° F. and increases rapidly up to about 950° F.

One advantage of my vapor phase sulfurization treatment in a reducing atmosphere is that I may utilize metal from which the scale has not been removed as well as clean metal. Instead of removing the scale with an acid or surface treatment, I am able to convert the scale directly into the desired ferrous sulfide. A trace of water or water vapor to initiate the reaction is usually necessary in order to obtain efficient reduction of the iron oxide of the scale to ferrous sulfide. With high chromium and stainless steels, a catalyst such as phosphorus, halogen, a phosphorus or a sulfur halide or other suitable corrosive compound containing such elements is desirable to promote the reaction.

The atmosphere itself should be a reducing or a neutral, non-oxidizing atmosphere. An oxidizing atmosphere forms hard, undesirable ferric oxide and sulfide compounds such as iron pyrites or magnetic iron scale.

EXAMPLE II.—SULFURIZING IN AMMONIA ATMOSPHERE

Hot rolled 18–8 stainless steel rod coated with mill scale is placed in an annealing furnace in an atmosphere of 75 per cent disassociated ammonia and 25 per cent nitrogen and heated up to 1250° F. Free sulfur vapor is introduced from a generator containing boiling elemental sulfur and sulfur monochloride (liquid S_2Cl_2) is separately dripped into the furnace to furnish a sulfur halide catalyst to reduce the scale and assist its conversion to iron, chromium and nickel sulfides. The furnace temperature is kept between 1250° and 1800° F. for 10 to 25 minutes and then the work is removed. It is found to be coated with a relatively thick, fixed layer of mixed metal sulfides.

EXAMPLE III.—SULFURIZING IN BURNER GAS ATMOSPHERE

The work is placed in an atmosphere of exhaust burner gas containing nitrogen, CO_2 and excess air and heated up to between 900° and 1300° F. Sulfur vapor from a vaporizer is bled into the mixed stack gases where it combines with the oxygen of the excess air to produce a reducing and sulfurizing atmosphere to form a complex layer of iron sulfide on the ferrous surface after a few minutes exposure.

SULFURIZING BY THERMAL DECOMPOSITION OF A SULFUR COMPOUND

Another method of forming an integral ferrous sulfide coating upon ferrous metals is to cover the work with an alkaline layer of a sulfurizing agent and then heat the work in an annealing furnace, or a flash baker. After steel has been hot rolled and initially shaped, the pieces have to be annealed to restore the ductility for further cold work. In the vast majority of cases, the anneal is performed in an uncontrolled furnace at atmospheric pressure so that the work becomes heavily scaled and must be pickled before further cold work or drawing can be performed. When the work is covered with an alkaline film of a sulfurizing agent and heated, however, the heavy scaled layer on the hot rolled steel is converted to ferrous sulfide and the work made ready for cold drawing and shaping. In this way, I eliminate the pickling step and utilize the annealing step to deposit a layer of ferrous sulfide on the metal.

The alkaline sulfurizing agent consists of a fusible alkali metal salt and a reducible sulfur compound that will convert the ferrous layer to iron sulfide and alkali ferrates when heated to a red heat and thus give an integral coating which can be cold worked without harming the working tools and dies. The magnetic iron oxide usually formed during hot rolling and annealing is highly abrasive to tools and dies. In addition to the fusible alkali salts and sulfurizing agents, fusible pigments can be incorporated or dispersed into the alkaline layer. A combination of pigments with an alkali coating is preferred for carbon steel while an unpigmented film can be used for stainless steel.

A suitable alkaline type coating is given below. The mole fraction of each chemical is given so that chemically equivalent compounds can be readily substituted by anyone skilled in the art.

EXAMPLE IV.—COATING FOR SULFURIZING DURING ANNEAL

	Molarity	Typical Mix, Parts Dry Wt.
Sodium hydroxide	0.2	8
Sodium carbonate	0.1	11
Sodium thiosulfate	0.1	25
Sodium Metasilicate or Trisodium phosphate	0.1	38
Sulfur	0.3	10
Starch		8

This is made up into a 15 per cent to 33 per cent aqueous solution and applied to the work by dipping in the hot solution prior to annealing. Tenth molar sodium borate or sodium silicate can be used as a fusible alkali salt component in place of the 0.1 mole tri-sodium phosphate shown. Likewise, the chemical equivalent sodium sulfide, sodium sulfite, polysulfide, or polythionate can be substituted for sodium thiosulfate. The free sulfur in the above formula will be taken up in any case to form sulfides and polythionates. This film has additional complex chemical reactions when the work is heated. Iron sulfide and alkali ferrates are formed and when phosphates are used as the fusible salt, it is believed that some thiophosphates are formed. When sodium silicate is used as the fusible salt, certain ultramarine type silicates are formed.

The work is dipped in the solution which is heated up to 180°–200° F. and the hot solution allowed to dry on the work before being placed in an annealing furnace or passed through a continuous open flame gas annealer.

EXAMPLE V.—INTEGRAL IRON FLUORIDE COATING

Another readily applied integral coating is an iron fluoride layer. This is applied by immersing the work in a solution of sodium acid fluoride with sodium phosphite or sodium sulfite as the accelerator as follows:

Dissolve 8 to 32 ounces of sodium bifluoride and ¼ to ½ ounce of sodium phosphite

$$(NaH_2PO_2.H_2O)$$

or sodium sulfite in each gallon of water. Immerse the work in this solution maintained between 120° and 160° F. for 5 to 15 minutes and then dry. This will form an adherent integral coating of iron fluoride, containing some ferrous phosphite or sulfite.

INTEGRAL PHOSPHATE COATINGS

A predominately iron phosphate film can be formed on ferrous stock by dipping it in solution of a diacidic phosphate such as sodium dihydrogen phosphate, potassium dihydrogen phosphate, ammonium dihydrogen phosphate, magnesium dihydrogen phosphate or calcium dihyrogen phosphate accelerated with an oxidizing or reducing agent. Suitable oxidizing agents are sodium chlorate, sodium nitrite, sodium nitrate, hydrogen peroxide, potassium persulfate, picric acid, quinone, and various other chlorates, bromates, and iodates. Likewise, suitable reducing agents are sodium sulfite, sodium thiosulfate, and sodium phosphite.

EXAMPLE VI.--IRON PHOSPHATE COATING

	Parts
$(NH_4)H_2PO_4$	75
$CaCl_2$	11
H_2O	14

This is made up 5 per cent by volume into an iron phosphating solution. This bath could be accelerated by bubbling in gaseous nitrosyl chloride or by adding aqueous nitrobetaine, or NOCl amine complexes or Roussin's salts which are nitroso complexes of iron and sulfur. These are further described on page 678 of the Fritz Ephraim's Inorganic Chemistry, 4th ed. (1943). This is an improvement to the Glen L. Williams Patent No. 1,514,494 which disclosed phosphating solutions containing an unstable mixture of aqua regia and Steffan's sugar beet waste as accelerators. Zinc di-hydrogen phosphate or manganese dihydrogen phosphate can be used in place of the mono-ammonium phosphate shown in the foregoing example if a heavier mixed zinc or manganese and iron phosphate is required.

EXAMPLE VII.—COPPER IMMERSION PHOSPHATE

	Per cent
Mono-sodium phosphate	3
Copper sulfate	0.1

This bath should be maintained at around 180 F. The integral coating of immersion copper mixed with copper and iron phosphates formed by immersing the work in this bath forms an excellent base for any subsequent lubricant coating.

EXAMPLE VIII.—ZINC PHOSPHATE BATH

Solutions of manganese phosphate, cadmium phosphate, and zinc phosphate will form heavier integral lubricating coatings comprising iron phosphate when accelerated with sodium nitrate or nitrite, hydrogen peroxide, or sodium chlorate than the previous iron phosphate coatings. Such heavy coatings are obtained by various prior art methods such as the following:

	Per cent
$Zn(H_2PO_4)_2$	3
$NaClO_3$	0.6
H_3PO_4	0.5

Maintain this bath at 160° to 180° F. and immerse the pickled stock for 5 to 10 minutes to form an integral coating of mixed iron and zinc phosphates.

Phosphate coatings are particularly valuable for drawing and cold working of metal because after the drawing or cold working has been completed, the phosphate coating forms a protective and anti-corrosion layer. It is also a very good base over which to apply the binders used in my stepwise lubricants. The phosphate baths, however, do not coat over stainless steel, so that oxalate, sulfide or fluoride baths must be used on these alloys.

INTEGRAL ORGANIC ACID COATINGS

Other integral coatings can be formed on the metal by treatment with selected organic acids. This process is fully explained in Patent No. 1,911,537 to Robert Tanner. Briefly, it consists of immersing or spraying the metal with a hot solution of aliphatic series acids with dicarboxyl groups or hydroxydicarboxyl groups or with aromatic series acids with one carboxyl group or sulphonic acids. The reaction is preferably accelerated with an oxidizing agent such as manganese dioxide or sodium sulfite and varies with each acid used. The best of the pure hot solutions are oxalic, malonic, tartaric, salicyclic, gallic, and diglycollic acids.

The coatings formed are mainly iron salts of the acids used. Thus oxalic acid forms ferrous-ferric oxalate, tartaric acidferrous-ferric tartarate and so forth. These organic iron salt films are thermoplastic or meltable by secondary reactions largely based upon the splitting off of fusible organic acids under heat, but augmented by the termal formation of fusible sodium formal and sodium carbonate. In addition, the strong reducing action of the termally decomposed organic iron salts causes the formation of fusible ferrous oxide melting at 1420° C. instead of the infusible ferric oxides. While such organic iron coatings are fluxed by binder-lubricants such as soap-borax mixtures and form additional low melting eutectics with any residual ferrous oxide or carbonate; it is preferable to rinse the integral organic iron coatings in hot aqueous solutions of an alkaline sulfide, borax, or disodium phosphate to both imbibe fusible flux salts and to form fusible iron salts and fusible sodium salts by ion exchange.

EXAMPLE IX—OXALATE COATING BATH

Prepare an aqueous solution of one part of sodium sulfite to fifteen parts of oxalic acid with preferably a small amount of manganese dioxide, one fortieth as much manganese dioxide as oxalic acid being a good ratio. The work is dipped in this solution at room temperature or slightly warmer, and the coating should form in a minute or so.

MELTABLE PIGMENTS FOR STEPWISE LUBRICATION

According to my present invention, the fixed integral films previously described are coated with a binder through which is distributed various meltable pigments. The pigments must have a Mohs' hardness of less than 5 and melt below the melting point of the work or the die, whichever is lower. The pigments generally melt above 500° C. and are various soft and fusible metal compounds.

The pigments in each lubricant are selected in relation to the integral film and binder so that there is effective stepwise or graduated lubrication between the work and die throughout the great portion of the drawing operation. Thus, the binders usually melt below 200° C. to furnish initial lubrication, so that the pigments selected should melt between 200° C. and 1300° C. or roughly, the melting point of the work if it is low carbon steel. Likewise, the integral film will usually melt around 900° C. if a phosphate and around 1050° C. if a sulfide. For this reason pigments melting between 900° C. and 500° C. are selected for incorporation in the binder.

The choice of the best combination of integral coating and stepwise lubricant is contingent upon the amount of reduction required in the forming operation. In general, a light reduction of 15 to 25 per cent can be taken upon work coated with a conventional iron phosphate coating of 50 to 150 mg. per sq. ft. or the equivalent light sulfide or oxalate coating. For a heavier draft of 30 to 50 per cent, a heavy zinc (and iron) phosphate, iron sulfide, or iron oxalate coating of 200 to 1000 mg.

per sq. ft. is to be preferred. With a light coating of iron phosphate or its equivalent that will undergo a 15 to 25 per cent reduction, a dry lubricant film obtained by immersing the pre-coated work in a hot aqueous solution of 2 ounces per gallon of sodium tallow soap and 10 ounces per gallon borax, then draining and drying the work, is very satisfactory. To draw the same piece to a greater reduction of, for example, 30 to 40 per cent it would be preferable to apply the heavier zinc phosphate coating or its equivalent iron sulfide or oxalate layer, and to film the heavier undercoating by immersion in a hot aqueous solution containing 3 ounces per gallon sodium tallow soap, 16 ounces per gallon borax, and 2 ounces per gallon precipitated chalk, or an equivalent fusible pigment. The precipitated chalk reacts in the hot borax solution to form a fusible shell of sodium carbonate and calcium borate over each minute particle and is thus equivalent to a fusible pigment.

If it were necessary to draw this same workpiece to an extreme reduction of 50 to 65 per cent, or to make more than one reduction without recoating the piece, it would likewise be desirable to apply a heavy zinc phosphate or an equivalent heavy undercoating, but an initial water insoluble stepwise lubricant would be first applied to the heavy integral undercoating as a solvent paint or water emulsion consisting of thinner, a thermoplastic binder, and fusible pigments. When this initial water insoluble stepwise lubricant film has dried or set-up, the work is then coated with an aqueous soap and borax type lubricant, and drawn to the extreme reduction. When such duplex lubricant layers are used in severe or multiple drafting, the water soluble stepwise lubricant is rolled back into the die throat and the water insoluble thermoplastic binder and fusible pigments are forced into the drawn surface to prevent any metal-to-metal contact, and to leave a residual stepwise lubricant film that can be recoated with the water soluble stepwise lubricant, and again drawn. This duplex method is shown in Examples XV and XVI.

As a production cost factor, any appreciable increase in drawing speed or reduction will absorb any reasonable expenditure for properly coating the work and using the best suited lubricant.

Table I.—Fusible Pigments

Pigment	Formula	Mohs' Hardness	Melting Point, ° C.
Aluminum stearate	$Al(C_{18}H_{35}O_2)_3$	1.0	180
Antimony oxide	Sb_2O_3	2.5-3.0	656
Antimony sulfide	Sb_2S_3	2.0	550
Arsenous oxide	As_2O_3	1.5	315
Arsenous sulfide	As_2S_3	2.0	307
Barium pyrophosphate	$Ba_2P_2O_7$	3.0	980
Bismuth sulfide	Bi_2S_3	2.0	685
Boric anhydride	B_2O_3	3.0	577
Calcium tetraborate	CaB_4O_7	3.0	986
Calcium stearate	$Ca(C_{18}H_{35}O_2)_2$	1.0	....
Cadmium pyrophosphate	$Cd_2P_2O_7$	3.5	900
Cobalt sulfide	CoS	[1] 4.0	1,116
Chromium fluoride	CrF_3	[1] 4.5	1,000
Copper Powder	Cu	2.5-3.0	1,003
Copper sulfide	Cu_2S	2.0	1,130
Ferrous sulfide	FeS	3.5-4.0	1,193
Ferrous fluoride	FeF_2	3-4	1,000
Ferrous phosphate	$FeHPO_4$	2-3	1,050
Lead Borate	PbB_4O_7	1.5-2.0	278
Lead Chromate	$PbCrO_7$	2.5-3.0	844
Lead Molybdate (wulfenite)	$PbMoO_4$	2.75	1,068
Lead oxide (litharge)	PbO	2.5	888
Lead phosphate	$Pb_3(PO_4)_2$	3.0	1,014
Lead metasilicate	$PbSiO_3$	3.0	766
Lead sulfide (Galena)	PbS	2.5	1,120
Manganese pyrophosphate	$Mn_2P_2O_7$	3.5	1,196
Manganese borate	MnB_4O_7	3.5	950
Mercury sulfide (vermilion)	HgS	1.0-1.5	446
Mercury chloride (calomel)	HgCl	1.0-2.0	302
Molybdic oxide	MoO_3	2.0	795
Nickel sulfide	NiS	3.0-3.5	797
Sulfur	S	1.5-2.0	120
Molybdenum sulfide	MoS_2	2.0	1,185
Vanadium pentoxide	V_2O_5	2.5	690
Zinc palmitate	$Zn(C_{16}H_{31}O_2)_2$	1.0	419
Zinc borate	$3ZnO-2B_2O_3$	3.0	980
Zinc phosphate	$Zn_3(PO_4)_2$	3.5	900

[1] About.

Various binding materials are usable in conjunction with the present invention. The binder serves as a vehicle for incorporating the meltable pigments to distribute them uniformly over the work surface and to protect and lubricate the inner integral film of phosphate or sulfide by acting as an initial lubricant between the work and die over the lower temperature ranges.

The binding material is preferably a thermoplastic natural or synthetic resin having a melting or softening point below 300° C. The choice of vehicles and pigments is usually determined by the expenditure that can be made and the severity of service required. When the service is not so severe and the expenditure is limited, a heat labile binding material such as the organic colloids which decompose at relatively low temperatures may be used and the principal reliance for lubrication based upon the fusible pigments. On the other hand, when there is severe service and suitable expenditures can be made, a fusible natural, synthetic or resinous material is preferred.

Corrosive vehicles, i. e., those containing sulfur or chlorine, such as solutions or dispersions of chlorinated diphenyl (Arochlor), chlorinated rubber (Tornesit), ethylene polysulfide polymers, chlorinated paraffin, 2-chlorobutadiene polymer (neoprene) and vinyl chloride are especially desirable in that they tend to bond directly to the metal through their polar linkages. In addition, their decomposition under frictional heat will cause the formation of a fusible iron chloride or sulfide as a secondary lubricant.

In lubricating compositions of the present invention, the proportions of pigment and vehicle may be varied widely to obtain the desired fluidity. Usually, it is preferable to have 10 to 30 parts of vehicle or binder for each 100 parts of composition, the remainder being pigment and solvent. The vehicle is thus considered as the residue in the fixed film after evaporation of the solvent. The pigments generally comprise from two to five times the amount of the vehicle.

Examples of suitable natural and synthetic thermoplastic resins which may be utilized in conjunction with the suitable fluidity-imparting agent, such as a solvent, plasticizer, or dispersing mixture are listed below:

Table II

	Softening Point and Melting Range, ° C.
Resins-Synthetic:	
Acrylic ester polymers (polymethyl methacrylate type)	105–120
Alkyd type, non-oxidizing (glycerol-phthalic anhydride type)	75–115
Alkyl type, oxidizing (unsaturated fatty acids)	90–100
Alkyl type, modified (rosin, etc.)	80–110
Cellulose acetate (Aceto-butyrate)	60–120
Cellulose nitrate	60–90
Coumarone-indene	75–100
Cycloparaffin (napthenes or completely saturated carbocyclic compounds)	100–110
Ester Gum	70–100
Ethyl cellulose	100–130
Styrene polymer	82–95
Toluene sulfonamide formaldehyde	70–100
Polyvinyl chloride	....
Polyvinyl acetate	100–160
Chlorinated rubber	....
Resins-Natural:	
Amber	250–300
Asphaltum	90–100
Bitumen	90–110
Gilsonite	115
Natural resins (Dammar, Copal, etc.)	85–150
Rosin	130
Shellac	110–150
Waxes, natural	40–60
Waxes, petroleum	25–60

All of the binders or resins listed above in Table II are meltable and thus form an additional lubricant for the work as the deforming operation progresses.

The resins listed below in Table III are suitable for use with a solvent, plasticizer, or dispersing mixture to give a binder, but they are thermosetting at higher temperatures and do not melt so that an additional lubricant should be used with them.

Table III.—Thermosetting Resins

Melamine or urea-aldehyde polymers
Casein-formaldehyde
Phenol-formaldehyde

Water soluble binders suitable for use with other water soluble or water insoluble pigments are listed below. These binders are divided into two groups, the lubricating or melting binders and the non-lubricating or charring binders which carbonize or decompose at elevated temperatures.

Table IV.—Water Soluble Lubricating Binders

Carbowax (a polyalkylene glycol ether)
Glycerol and glycol borates and phosphates
Glycol stearate
Polyalkylene glycol oleate or stearate
Sodium palmitate
Sodium stearate
Sodium oleate

Water Soluble Non-Lubricating Binders

Ammonium alginate
Casein
Dextrin (starch gum)
Gelatine and glue
Gum arabic, tragacanth, etc.
Methyl cellulose
Pectin
Polyvinyl alcohol
Hydroxy ethyl cellulose
Sodium glycolate
Sodium resinate

Water Soluble Non-Lubricating Binders

Sodium naphthenate
Starch

When a water soluble, non-lubricating binder is used it is also necessary to use some sort of additional lubricant for the lower temperature ranges (100–400° C.). Good lubricants for this purpose are the various commercial drawing and cutting oils, lubricating oils, soaps of all kinds, especially high titre, high tallow soaps, soap and borax mixtures, and the various natural and synthetic waxes.

CONCLUSION

From the preceding discussion, it is evident that a wide variety of lubricant compounds and compositions can be formulated which utilize my invention. In all cases, the formula used should vary with the particular problem presented and the conditions under which it is used. In addition, the relative cost of the compounding materials should be influential in determining exact lubricant components.

In order to facilitate complete disclosure of this invention, I am listing a series of examples of the drawing or deforming of metal. It is understood that the invention is by no means limited thereby and that these are only typical formulas selected from the wide range of combinations of integral coatings and lubricants such as are above described.

EXAMPLE X.—THERMALLY FORMED OXALATE

A solution of the following composition was made up:

	Oz. per gal.
Ferric oxalate 1.0 molar	50
Oxalic acid 1.0 molar	17
Calcium chloride 1.0 molar	17

The above solution is heated to 115° F. and a yoke of pickled stainless steel rod immersed in the solution, and the excess solution allowed to drain off after a two minute immersion. There is no noticeable coating action in such a short immersion at such a low temperature, but a coating of insoluble ferrous and calcium oxalates are formed when the oxalate film is dehydrated in the flash baker. The film of insoluble oxalate is firmly bonded to the stainless surface. The dried oxalate coated wire is thereafter drawn through a plurality of successive dies with no further treatment by utilizing a stepwise box soap powder containing a flux and mineralizer and having the following composition:

Sodium stearate	45 per cent	0.15 molar
Sodium sulfite	12 per cent	1.10 molar
Borax	38 per cent	0.10 molar
Moisture	5 per cent	

This soap is made by crutching ground borax glass and anhydrous sodium sulfite into the sodium stearate after saponification to remove water and then pouring the molten mixture into frames, and grinding the dry soap into a powder.

EXAMPLE XI.—WATER SOLUBLE SULFIDING LUBRICANT

As aforementioned it is possible to form an integral ferrous sulfide coating on articles to be drawn with a reagent that will become also a water soluble stepwise lubricant, when the residual film is dried on the work. Such a combination coating and lubricating bath can be made up by dissolving 8 to 20 oz. per gallon of the following composition in hot water:

Diethylene glycol stearate or sodium stearate		20 per cent
Starch or polyvinyl alcohol		10 per cent
Boric acid H_3BO_3	0.48 molar	30 per cent
Sodium thiosulfate, $Na_2S_2O_3.5H_2O$	0.16 molar	40 per cent

The bath is heated up to 180–200° F. and the degreased carbon steel work immersed in the hot solution for about five minutes, during which time a black iron sulfide film is formed on the surface by the polythionic acid decomposition products. The work is removed, then drained and dried, and the film remaining on the work is a stepwise lubricant by virtue of the polar stearate, protective colloid, and fusible flux salts comprising the dry homogeneous film. The reactions which take place are as follows:

(1)

$$4Na_2S_2O_3 + 12H_3BO_3 \longrightarrow 2Na_2B_4O_7 + 10H_2O + 4H_3BO_3 + \underbrace{4S + 4NaHSO_3}_{\text{Polythionate}}$$

(2) Decomposition on drying:

$$2Na_2B_4O_7 + 4H_3BO_3 + 4S + 4NaHSO_3 \longrightarrow 3Na_2B_4O_7 + Na_2S_4 + 4SO_2 \uparrow \text{(gas)}$$

The dried film therefore contains sodium tetraborate and sodium tetrasulfide in addition to the protective colloid and polar stearate lubricant. The coated metal is thereupon deformed by passing it through a die.

EXAMPLE XII.—WATER SOLUBLE PHOSPHATING LUBRICANT

Combination coating reagent and stepwise lubricant similar to that in Example X can be formulated to form an integral phosphate coating on carbon steel, and also deposit a stepwise lubricant film. Such a bath can be prepared by dissolving from 8 to 20 oz. per gallon of the following dry powder.

	Parts
Diethylene glycol stearate or sodium stearate	20
Starch or polyvinyl alcohol	10
Mono-sodium phosphate, NaH_2PO_4—0.50 molar	60
Sodium thiosulfate, $Na_2S_2O_3.5H_2O$—0.17 molar	40

The bath is heated up to 180 to 190° F. and the degreased articles (steel tubes in this instance) to be phosphated are immersed in the hot solution for about five minutes, during which time an integral iron phosphate coating is formed by the mono-sodium phosphate accelerated by sodium bisulfate acting as a hydrogen depolarizer. The reactions are clarified by these equations:

(1)

$$Na_2S_2O_3 + 3Na_2HPO_4 + \underset{\substack{\nwarrow \\ \text{Coating Acid}}}{2NaH_2PO_4u} + \underset{\substack{\nwarrow \\ \text{Depolarizer}}}{NaHSO_4} + S$$

(2) Decomposition on drying:

$$Na_2HPO_4 + 2NaH_2PO_4 + NaHSO_4 + S \longrightarrow$$
$$2Na_2HPO_4 + NaPO_3 + SO_2 \uparrow \text{(gas)} + S\text{—}2H_2O$$

The dried coating film therefore contains two mols of disodium phosphate to one of mono-sodium phosphate so that I have an alkaline flux in addition to the colloidal sulfur, protective colloid and polar stearate lubricant. The articles thus coated with the integral undercoating of iron phosphate and with the superimposed fixed film of water soluble stepwise lubricant is thereupon drawn through suitable drawing dies to provide a reduction in size. Several passes are had without intermediate coating and the articles have a bright shiny surface. This combination of iron phosphate undercoating and water soluble stepwise lubricant is very satisfactory for drawing articles that are to be electroplated, and which must be grease free and easily cleaned.

It should be pointed out that both of the water soluble stepwise lubricants shown in Examples XI and XII tend to produce alkaline baths under continued use due to the neutralizing action of the iron being coated, and the breakdown of sodium thiosulfate to precipitated sulfur and volatile SO_2 to leave an alkaline Na_2O residue. Thus, occasional acid corrections must be made to restore coating action, or else the sluggish coating bath can be made alkaline by caustic additions to become a stepwise lubricant similar to Example XIV and XV and a new coating bath made up to replace the acid depleted coating solution.

EXAMPLE XIII.—SOLUBLE SOAP AND BORATE PIGMENT

A water slurry containing 8 oz. per gallon of a sodium stearate soap and 8 oz. per gallon of calcium borate pigment is heated to 190° F. and steel blanks coated by immersing them five minutes in the soap-calcium borate slurry and the blanks drained and dried by a hot air blast. The filmed blanks are then deep drawn in a hydraulic press operated die, producing shells with an excellent finish. The drawn shells are then cleaned by swilling off in hot water.

EXAMPLE XIV.—SULFURIZING SOAP TYPE LUBRICANT

The work is dipped in the stainless steel coating solution of Example I, left in it for around five to fifteen minutes during which time a black sulfide coating is formed on it. It is then dipped in a 20 per cent water solution of the following dry powder, dried, and deformed by drawing through a die.

	Molarity	Typical Mixture, Percent
Soap	0.1	30
Starch	----------	5
NaOH	0.1	4
K_2CO_3	0.05	7
Sulfur	0.3	9
$Na_2S_2O_3$	0.1	20
$Na_2B_4O_7$—anhydrous	0.1	20
$CaCO_3$	0.05	5

EXAMPLE XV.—EMULSION PAINT LUBRICANT

	Pounds/parts
Antimony oxide (M. P. 315° C.)	164
Zinc borate (M. P. 980° C.)	493
Linseed oil modified	
Alkyd resin	206
Cobalt Linoleate (6% cobalt)	2
Oleic acid	25

Casein	21
2-amino methyl propanol	7
Algin	3
Water	392

The above ingredients are mixed in any desired order to provide an aqueous emulsion paint.

Low carbon steel sheet is first cleaned and then given a phosphatic paint base coating by treatment in a bath of calcium dihydrogen phosphate. The phosphated sheet is then painted with the antimony oxide-zinc borate paint given above. When the painted sheet is thoroughly dry and has formed a fixed solid film it is immersed in a solution of hot paraffin containing 30 per cent calcium stearate. This completely waterproofs the sheet and leaves a lubricating wax protective layer on the paint. The sheet is then deep drawn into a cylinder on a hydraulic press using a flowed water coolant and lubricant containing 2 oz. per gallon of sodium stearate and 2 oz. per gallon of borax. The drawn cylinder has a highly lustrous finish, free from galling or scratch marks so that a desirable finish may be applied by merely a dip or spray with a thin clear lacquer. This stepwise lubrication can be shown to consist of the following progressive melting cooling sequence:

(1) Paraffin melting at 50° C.
(2) Calcium stearate melting at 80° C.
(3) Water acting as coolant.
(4) Alkyd resin vehicle melting at 110° C.
(5) Antimony oxide melting at 656° C.
(6) Zinc borate melting at 980° C.
(7) The phosphate coating melting around 1000° C.

EXAMPLE XVI.—ETHYL CELLULOSE LUBRICANT PAINT

	Parts
Ethyl cellulose	16
Hydrogenated rosin	8
Castor oil	4
Toluene	54
Hy-flash naphtha	10
Butanol	8
Ferrous sulfide pigment (M. P. 1193° C.)	24
Nickel sulfide pigment (M. P. 797° C.)	24

The two sulfide pigments are milled into the heated ethyl cellulose and the mixture thus formed together with the rosin is dissolved in the solvent. The metal to be worked is first placed in a furnace and heated up to 900° F. in a controlled atmosphere of cracked natural gas. When the metal has reached a red heat sulfur vapor is introduced into the furnace in a sufficient amount to produce a black color over the surface of the metal. The metal is cooled in a reducing atmosphere and then coated with the above pigmented composition. The metal is then deep drawn into a cylinder on a hydraulic press using as a fluid flowed over the coated black an aqueous solution of coolant and lubricant of four ounces of diglycol stearate per gallon of water. The article produced has a black, shiny protective surface which can be coated with paints as desired without cleaning.

EXAMPLE XVII.—CHLORINATED RUBBER LUBRICANT

A chlorinated rubber, thermoplastic paint is made up having the following composition:

	Parts
Chlorinated rubber	20
Chlorinated diphenyl	8
Turpentine	35
Hy-flash naphtha	35
Butanol	2
Cuprous chloride pigment	40

This paint is used to coat a stainless steel rod previously sulfurized as by Example II. Cuprous chloride is used to pigment this formula since it is not adversely affected by any hydrogen chloride which might be evolved by the thermal decomposition of the chlorinated rubber.

The rod is drawn to 25 per cent reduction and still has a bright finish after drawing.

EXAMPLE XVIII.—EMULSION PAINT

	Per cent dry weight
Calcium resinate	4
Calcium stearate	4
Paraffin wax	10
Emulsified by:	
Sodium stearate	3½
Sodium resinate	3½
Ferrous sulfide	20
Calcium sulfate	30
$Na_2B_4O_7.10H_2O$	25

This is to be considered as only illustrative of the emulsions that can be used.

EXAMPLE XIX.—BUMPER BAR FORMING LUBRICANT

Cold forming has replaced the former hot forging of automotive bumpers, so that the bumper bar stock can be machine polished in the flat, and the polished stock phosphated and coated with a water soluble stepwise lubricant that can be readily cleaned off so that no defective nickel plating will be caused by any lubricant residues. Since the deformation in this operation is great, it is preferable to use a medium phosphate coating, but since production time is of the essence, it is best applied by an accelerated zinc phosphate bath such as that in Example VIII.

After the bumper stock is phosphated and rinsed, a stepwise lubricant is applied by roller coating, and the applied lubricant film quickly dried by hot air blast or an infra red drier. A satisfactory composition is the following:

Soluble Bumper Lubricant

	Molarity	Weight Percent Comp.
Sodium tallow soap	0.15	10
Carbowax 6000	0.001	5
Potassium carbonate K_2CO_3	0.15	20
Boric acid H_3BO_3	0.10	20
Borax $Na_2B_4O_7.10H_2O$	0.10	35

The above dry powder is made up into a warm soft water solution at a concentration of about 14 oz. per gallon and the solution maintained between 160 and 175° F. for roller or drip application. This type of lubricant is disclosed in the Orozco and Henricks Patent No. 2,469,473.

EXAMPLE XX.—SOAP AND BORAX LUBRICANT

Carbon steel blanks for deep drawing were cleaned in an alkaline cleaner, rinsed, and dipped in cold 15 per cent muriatic acid to give a minute etch, again rinsed, and then coated in the copper immersion accelerated mono-sodium phosphate coating bath disclosed in Example VII.

After phosphating and rinsing, the blanks were coated by immersion in a boiling solution of 15 per cent sodium tallow soap and 85 per cent borax at a concentration of 1 pound per gallon, and allowed to drain and air dry.

The blanks thus coated were deep drawn into cylinders with excellent die life and very few rejects due to surface imperfections attributed to the drawing operation.

This type of lubrication is disclosed in the Whitbeck Patent No. 2,470,062.

EXAMPLE XXI.—ALKALINE RINSE

Deep drawing stock was phosphated with a light iron phosphate coating in the ammonium dihydrogen phosphate bath in Example VI, which bath also contains calcium salts as well as some iron salts held in solution by the chloride ion as the iron nitrosyl complex. In order to augment the thin iron phosphate coating and to gain additional film pigments, the coated work was not water rinsed in the usual manner. Instead, the coated work still filmed with the coating solution is dipped in a hot still solution of 4 to 6 ozs. 1 gal. of disodium phosphate, and held in the solution for three minutes so that all of the calcium and iron absorbed in the unrinsed coating will be precipitated as insoluble phosphate. The sodium phosphate treated work was then coated in the following sulfurizing soap lubricant, still without rinsing.

	Molarity	Weight Percent
Sodium tallow soap	0.067	20
Starch	....	5
NaOH	0.10	4
K_2CO_3	0.05	7
Sulfur	0.30	9
$Na_2S_2O_3.5H_2O$	0.05	12
Trisodium phosphate	0.10	38
Chlorinated phenol	.001	1
Carbowax 6000	....	3
Pine oil	....	1

The work thus given the alkaline phosphate treatment had an improved undercoating film as evidenced by fact that the work so treated could be drawn to a greater reduction than identical work cold water rinsed after phosphating and coated with the identical lubricant.

EXAMPLE XXII.—SULFURIZING IRON HYDROXIDE COATINGS

Wire rod can be "sull" coated by allowing freshly pickled carbon steel to rust in the air while wet with water or a weak salt brine. Stainless steel can be provided with a hydrated oxide layer by dipping clean pickled stock in a fused sodium hydroxide bath containing about 10 percent sodium nitrate and maintained at 900° to 1000° F.

In either case, the hydrated iron oxide is converted to fusible iron sulfide mixture by immersion in a boiling polysulfide solution made up from 1 to 3 pounds per gallon of the following calcium sulfide coating:

	Molarity	Weight Percent
Calcium hydroxide $Ca(OH)_2$	0.32	25
Calcium chloride, $CaCl_2.H_2O$	0.16	20
Sulfur flour	1.25	40
Starch	....	10 to 40
Aryl-akyl sulfonate wetting agent	....	.5

The brown iron hydroxide layer is thus converted to a black iron sulfide mixture forming an integral fusible coating over the work. The rod is removed from the bath after a 3 to 5 minute immersion, and the calcium chloro-sulfide layer dried on the work in a flash baker to become a lime substitute. The coated rod is then drawn through a stepwise lubricant box soap such as that disclosed in Example X. The finished wire has a bright smooth black surface completely free of scratches or imbedded lime particles.

EXAMPLE XXIII.—SULFURIZED OXIDE COATING FOR WIRE

Carbon steel wire is "sull" coated in the same manner as the previous example or stainless steel wire is given an oxide coating in a fused caustic bath, and rinsed off and dipped in a hot sulfurizing soap lubricant solution such as that disclosed in Example XIII. The coated wire is darkened by immersion in the hot solution, but the hydroxide undercoating is not completely blackened until the soap film is dried in a flash baker after being drained and air dried.

The integral sulfide coating and water soluble stepwise lubricant film formed in this manner is drawn through a stepwise box soap lubricant of the following composition:

	Molarity	Weight Percent
Calcium stearate	0.1	40
Calcium hydroxide	0.05	36
Iron sulfide FeS	0.05	24

The wire so treated and drawn has a bright gray finish free of any scratches or drawn in lime particles.

While in the aforementioned examples I have usually shown one fixed film over the integral coating of iron salt on the metal, I may use more than one film to obtain further benefits from stepwise lubrication. Thus, the surface of the steel to be worked may be treated with a solution such for example as the baths of Example I containing polythionate materials equivalent to Wackenroder's solution to form an integral adhered coating to obtain iron sulfide upon the material. The thus treated metal after rinsing may be then filmed by contacting it with an alkaline earth polysulfide solution containing a colloidal carbohydrate such as starch or polyvinyl alcohol and the like. After drying the latter film on the metal it may be then quickly immersed in an aqueous soap and borax film such as previously described to provide a second film over the previous polysulfide film. The material thus treated may then be dried and subjected to extreme cold work.

Although several embodiments of the invention have been herein shown and described, it will be understood that in accordance with the provisions of the patent statutes, numerous modifications of the construction shown may be resorted to without departing from the spirit of this invention.

What I claim is:

1. In the lubrication of a ferrous metal surface which is subjected to sliding friction, the steps which comprise forming on the surface an integral coating by subjecting the surface to sulfur in the presence of a reducing atmosphere, and thereafter disposing over said coating an adherent meltable film deposited from solution and containing a meltable organic binder that is solid at room temperature, and a finely divided inorganic solid compound insoluble in solutions of said binder and having a melting point below the melting point of iron and of the integral surface coating and a scratch hardness less than 5 on a Mohs' scale, whereby said integral coating is protected and also stepwise lubrication is effected when sliding friction occurs and finally working said metal surface and subjecting it to sliding friction.

2. In a process of working ferrous metal the steps which comprise forming on the surface of the metal an integral coating of hexagonal black ferrous sulfide and superimposing on the thus coated metal a fluid composition capable of drying to a solid meltable film and comprising at least one meltable and fusible solid inorganic compound distributed through a fluid vehicle containing an organic binding material, said inorganic compound being insoluble in said vehicle, being meltable at a temperature less than the melting point of the ferrous sulfide and having a Mohs' hardness not exceeding 5, drying said fluid composition to a solid film and finally deforming said metal.

3. In a process of deforming a ferrous metal surface, the steps which comprise forming on said surface an integral coating of a solid ferrous compound having a melting point less than that of the ferrous metal and greater than the temperatures at which hydrocarbon lubricating oils are stable and which has a scratch hardness of less than 5 on the Mohs' hardness scale, thereafter forming over said surface an adherent coating comprising an organic binder in a solid state but having a melting point lower than that of said ferrous compound of said integral coating, and a plurality of finely divided

inorganic solids, at least one of which is an inorganic compound, which solids have a lower melting point than the melting point of said integral coating, said organic binder also having a melting point lower than that of said integral coating and that of said finely divided solids, and thereafter subjecting the metal to deformation, whereby said organic binder both protects said integral coating and cooperates therewith and with said finely divided solids to provide stepwise lubrication at different temperatures caused by said deformation.

4. The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

5. A method of treating ferrous metal prior to deformation thereof by drawing, which comprises subjecting said metal to contact with an aqueous solution comprising sulfur containing materials formed from sodium tetrathionate in the presence of boric acid to form an integral adherent coating comprising ferrous sulfide on the metal, drying over said integral coating an aqueous liquid comprising an organic water soluble film forming protective colloid and a meltable inorganic compound to form a film that is solid at room temperature, which is deposited from solution and which contains a meltable solid organic binder and a solid meltable inorganic compound having a scratch hardness of less than 5 on the Mohs' scale and a melting point less than the melting point of said integral coating and higher than the melting point of said organic binder and thereafter deforming the metal.

6. In the lubrication of metals, the method of forming a lubricant coating on ferrous metal surfaces by the steps which comprise subjecting the metal to contact with an aqueous acidic coating and etching bath containing polythionates to form an integral adherent coating containing iron sulfide upon the metal, the iron sulfide being derived from reaction of the bath upon the ferrous surface, then rinsing the coated metal and then filming the coated metal with an alkaline earth polysulfide solution containing a colloidal carbohydrate, drying the polysulfide and colloid film and then applying an aqueous soap and borax lubricant film over the previous polysulfide film and then drying the lubricant onto the coated metal surface.

7. In a process of working ferrous metal, the steps which comprise (1) forming on the metal surface an integral iron salt that has a lower melting point than the metal, (2) thereafter forming a meltable fixed film over said integral iron salt by coating the surface thereof with a film-forming, liquid composition containing a water-soluble organic binder that dries to a solid film and a meltable, solid inorganic compound, said inorganic compound and organic binder having melting points below that of the integral iron salt and having hardness less than 5 on the Mohs' hardness scale and (3) thereafter working the metal, whereby said solid film both protects said iron salt and cooperates therewith to provide, by difference in melting point, stepwise lubrication at the varying temperatures produced by the drawing operation.

8. In a process of working ferrous metal, the steps which comprise (1) forming on the surface an integral iron salt that has a lower melting point than the metal, (2) thereafter forming a meltable fixed film over said integral iron salt by coating the surface thereof with a film-forming liquid composition containing a water-soluble organic binder that is solid at room temperature and a plurality of solid meltable inorganic compounds distributed therethrough, said inorganic compounds and meltable binder having melting points below that of the

integral iron salt and a scratch hardness less than 5 on the Mohs' hardness scale and (3) thereafter working the metal.

9. In a process of working ferrous metal, the steps which comprise (1) forming on the metal surface an integral iron salt that has a lower melting point than the metal and a hardness less than 5 on Mohs' hardness scale, (2) coating the surface thereof with a film-forming aqueous solution containing a water-soluble organic binder and a plurality of water-soluble inorganic compounds which remain distributed through the binder upon drying, said binder and inorganic compounds having melting points below the melting point of the integral iron salt and a scratch hardness less than 5 on Mohs' hardness scale, (3) drying said solution to form a solid-at-room-temperature, meltable, fixed film over said integral iron salt, and (4) thereafter working the metal.

10. A method of treating ferrous metal which comprises subjecting said metal to contact with an acidic aqueous solution containing (1) colloidal sulfur, sulfur dioxide, and a mixture of polythionic acids, (2) a water-soluble protective colloid, (3) a water-soluble, lubricating organic binder, and (4) a member of the group consisting of fusible borates and phosphates, so that an integral coating is formed on the metal while in solution, then with-drawing the metal from said solution so as to leave an overlying film of organic binder with fusible borates and phosphates therein drying said film on the ferrous metal, and thereafter deforming said metal with the aid of a die.

11. The method of claim 7 in which the integral coating comprises an iron sulfide.

12. The method of claim 7 in which the integral coating comprises an iron phosphate.

13. The method of claim 9, in which the integral iron salt is water insoluble.

14. A bath for coating ferrous metal in preparation to a deforming action, comprising an acidic aqueous solution including a water-soluble protective colloid; a water-soluble stearate; a compound, the composition of which includes a radical selected from the group consisting of acidic phosphate radicals and acidic borate radicals; and a compound selected from the group consisting of sodium thiosulfate and the sulfur decomposition products of sodium thiosulfate.

15. A method of treating a ferrous metal having an integral-coating selected from the group consisting of iron sulfide coatings, phosphate coatings, and precipitated coatings of organic acid salts, provided thereon, comprising the step of superimposing a second coating over said integral coating; said second coating comprising an adherent meltable film containing a meltable organic binder that is solid at room temperature and an inorganic solid compound that is insoluble in solutions of said binder and having a melting point below the melting point of iron, and a scratch hardness less than 5 on a Mohs' scale.

16. As a new article of manufacture, a deformable ferrous metal, comprising, a ferrous metal base; an integral coating selected from the group consisting of iron sulfide coatings, phosphate coatings and precipitated coatings of organic acid salts, bonded to said ferrous metal base; and an adherent meltable film superimposed on said *integral coating; and meltable pigments dispersed in said adherent meltable film; said pigments having a melting point below the melting point of said integral coatings and a scratch hardness less than 5 on a Mohs' scale.*

17. A coating bath useable to provide an integral iron sulfide coating on a ferrous metal, comprising; an admixture of an aqueous, acidulated solution, including an unstable inorganic sulfur compound selected from the group consisting of sodium thiosulfate, sodium polythionate and sulfur mono-chloride with a water-soluble stearate.

18. A coating bath useable to provide an integral iron sulfide coating on a ferrous metal, comprising: an aqueous, acidulated solution including sodium thiosulfate and a water-soluble stearate.

19. As a new article of manufacture, a piece of blank metal stock for subsequent forming operations; said stock being coated with an integral phosphate coating; said integral phosphate coating being covered with an adherent meltable film superimposed thereon; said adherent meltable film having meltable pigments dispersed therein; said pigments having a melting point below the melting point of said integral coatings and having a scratch hardness less than 5 Mohs' scale.

20. As a new article of manufacture, a piece of blank metal stock for subsequent forming operations; said stock being coated with an integral oxalate coating; said integral oxalate coating being covered with an adherent meltable film superimposed thereon; said adherent meltable film having meltable pigments dispersed therein; said pigments having a melting point below the melting point of said integral coatings and having a scratch hardness less 5 on a Mohs' scale.

21. As a new article of manufacture, a piece of blank metal stock for subsequent forming operations; said stock being coated with an integral coating of a salt of an organic acid; said coating being covered with an adherent meltable film superimposed thereon; said adherent meltable film having meltable pigments dispersed therein; said pigments having a melting point below the melting point of said integral coatings and having a scratch hardness less than 5 on a Mohs' scale.

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IN THE U.S. DIST. COURT FOR THE DIST OF DEL.

Defendant's Accounting Trial
Exhibit No. A-17-2
[From *American Machinist*, July 20, 1953]

HOW DELCO-REMY COLD-FORMS METALS

By Robert L. Kessler, Master Mechanic,
W. P. Bowman, Process Engineer,
W. A. Fletcher, Chief Process Engineer,
Delco-Remy Division, General Motors Corporation

In a typical manufacturing setup for automobile parts, about 45% of the cost of a finished product is material, 35% is overhead and 20% is direct labor. Thus, to reduce the cost of a product, one of the best starting points is to seek ways to conserve material.

Waste of raw material in the form of chips may reach 70% on some types of "regular" production machinery. But with cold-forming equipment — presses and headers — the waste may be virtually nothing or only a few per cent. Material savings of 50% or more are common, according to our experience.

Another advantage of cold-forming processes is the fact that only standard machines are required. The costs of tooling up are therefore not expensive compared to special-purpose machines, and delays in starting parts manufacture are avoided.

High production rates are realized by the four cold-forming processes: sizing, flat and rotary swaging, coining, and extrusion — plain as through a die, and impact, as back over a punch. Good tool life is obtained.

The problem of how to make a part by cold forming is usually more difficult than to determine the value of doing so.

But the savings should always be large enough to permit paying for the equipment in one or two years. Often, the amortization period is a few months.

Flat swaging produces a better pole shoe

By changing the manufacturing method for generator pole shoes, Delco-Remy realized these advantages: (1) increased electrical efficiency of generator, (2) reduced amount of copper necessary in field coils, (3) greater freedom from rejects, as from grounding of coils forced over sharp corners, and (4) use of flat bar stock instead of a special rolled section. The savings in copper alone paid for the equipment.

Pole pieces were originally made from a special rolled section purchased in long bars, cut to length, and coined to thickness. Current processing involves six operations:

1. The 2½-in.-long blank with 45° corners is cut off from 0.545 × 3-in. SAE 1008 hot-rolled steel. With grain flow parallel to the 2½-in. dimension, splitting is practically eliminated.

2. The blank is bent to the correct radius of the pole piece. By bending at this stage, likelihood of jamming the part in the swaging die is avoided.

3. Pierce and countersink one side of the screw hole in a 2-stage die. Because of the metal thickness, the punches must have slight back draft.

4. Swage the wings surrounding the body of the piece. The piece is located by a pilot that countersinks the other side of the pierced hole.

5. Coin the thick middle section to a thickness tolerance of ± 0.002 in.

6. Drill and tap the pierced hole.

Production rate from the line averages 2000 pcs per hr.

Methods That Did Not Work

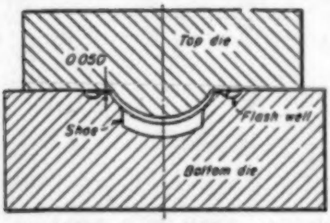


FIG. 2. METAL FROZE in the wings, trapped material at center

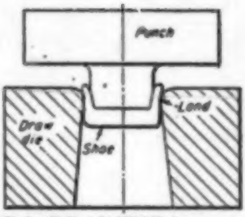


FIG 3. DRAWING in one step required too much reduction. Wings tore

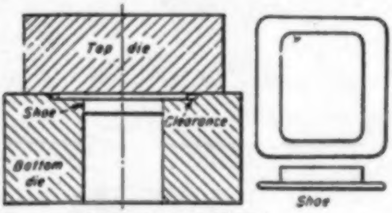


FIG. 4. FLAT SWAGING, cold, worked, but the wings had to be bent

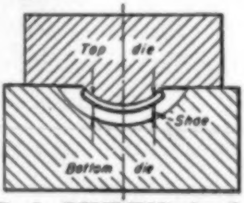


FIG. 5. BENDING the flat-swaged body caused depressions at arrows

Methods That Were Successful

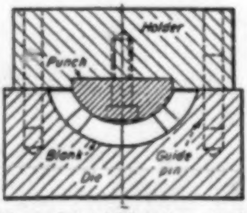
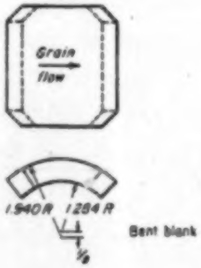


FIG. 6. BLANK is bent before swagging. Note different radii



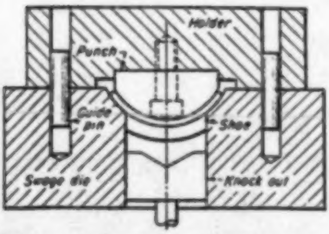


FIG. 7. NO STICKING of work occurs with straight walls in die cavity

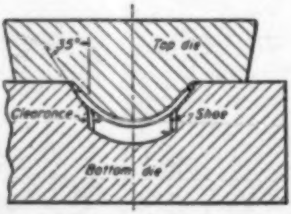


FIG. 8. SIZING DIE sets wings at desired thickness and position

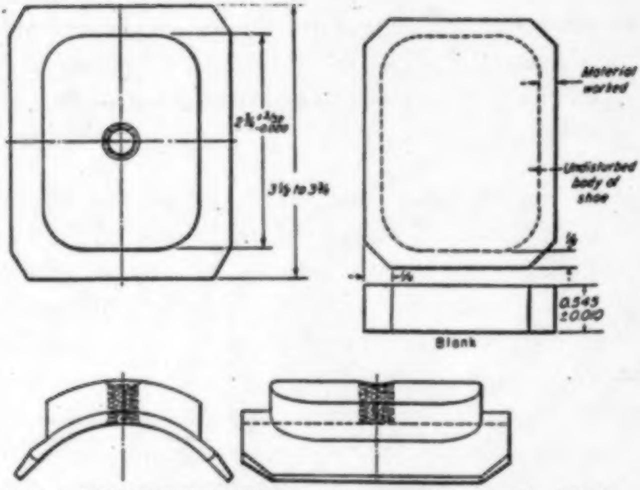


FIG. 1. SWAGING OCCURS at the edges of the pole-shoe blank, outside of the dotted line. Reduction in thickness is 72%. SAE 1008 hot-rolled steel is used

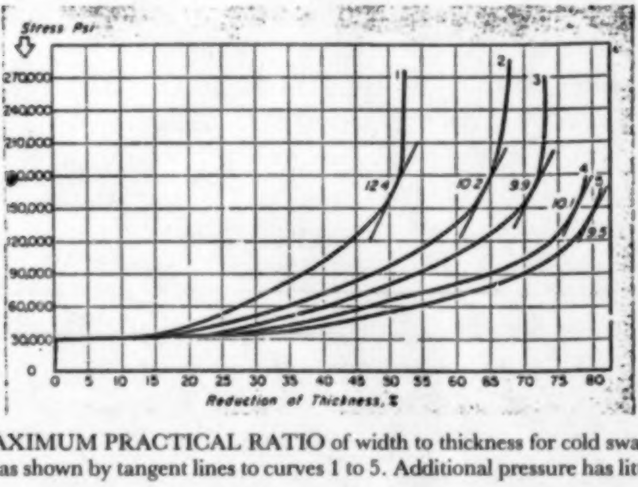


FIG. 9. MAXIMUM PRACTICAL RATIO of width to thickness for cold swaging is 10:1, as shown by tangent lines to curves 1 to 5. Additional pressure has little effect

Development Work

The technique involved in making the cold-formed pole shoe was established only after consideration of various methods and making numerous experimental setups. This work is of interest because it illustrates the methods that would be attempted by experienced methods engineers. The results obtained may help to indicate to others in industry if somewhat comparable cold-forming jobs can be performed successfully.

Hot Forging. First method attempted was hot forging a 1⅜ × 2½-in. slug of low-carbon steel heated to 1800-2100 F. The slug contained the right amount of material and should have filled the die space when struck in either a 100-ton mechanical or 400-ton hydraulic press. Actually, in both cases, the metal moved just so far in the wings, then froze and trapped the metal in the center. Hence, the shoe was too thick in the center. Forging temperature made no noticeable difference in results. Erosion of the die is high because the die cannot be lubricated.

Drawing Method. In this process, a slug of hot-rolled steel was drawn cold through a rectangular die with a rectangular punch, forming the wings in the process. Sizing would follow. But in the drawing operation the reduction in thickness was so great that the wings were pulled from the main body of the shoe. Possibly the drawing method could be used if the reduction is accomplished in two or more stages with intermediate annealing, but the expense is too great.

Cold Swaging. In an experimental setup, the pole piece was easily made by the flat-swaging process, but later, in bending the body to the desired curvature, depressions were produced at the junction of the wings and body by concentrated pressures. Success was in sight. It was decided to place a flat slug of hot-rolled steel between two dies with the pole-shoe radii on them, and to swage and bend the shoe at the same time. Actually, it was found necessary to bend the blank first and swage in a subsequent operation, as stated earlier, because the blank tended to wedge in the combination bending and swaging dies. Sticking was because the metal flowed outward in the body of the shoe, locking it in the die. With a pre-bent blank, however, the metal flowed only in the downward direction and did not lock in the die.

Two further "kinks" were discovered during the experimental work: First, the cavity in the swaging die for body of the shoe must have perfectly straight walls. Any draft caused locking and ejection was impossible. Second, a slight dip was placed in the end of the body, so that metal would flow uniformly into the wing sections and fill them completely. Finally, the dip was eliminated by reducing the corner radius on the body.

Pressure Calculations

When the shoe is swaged, the only metal that actually flows is in the rim. To find the pressure required to swage the piece, it was necessary to calculate the area of the swaged portion and the percent reduction in thickness. Area worked at the start equalled 2 sq in., and that at the end equalled 6.75 sq in. Yield point of the steel is 30,000 psi. Hence, force to start metal flow is 2 × 30,000 = 60,000 lb or 30 tons. Reduction for a 5/32 in. thick wing equals 0.555 (original thickness) −0.156 = 0.399 in. Percent reduction = 0.399 ÷ 0.555 = 72%. From curve 5, Fig 9, it is seen that the pressure required at the end of swaging is 96,000 psi. On the basis of a final area of 6.75 sq in., the total force needed is 325 tons. Because of stock variations in respect to hardness and yield point, plus need for a safety factor, one would use a 400-ton press.

Now suppose we had wanted to make the wing ⅛ in. thick. The reduction would have been 77.5% and the pressure 123,000 psi. The shoe stock has an ultimate strength of 110,000 psi. Hence, in almost every case, we could expect the shoe to split in swaging.

Theory of Cold Working

Pressure calculations as above were made after a study of the theory of cold working of metals. When pressure is applied to metal, it must deform a slight amount in order to exert a counteracting force. Deformation occurs at the weakest, or "slip", planes. After all of the slip-plane movement has been used by cold working, any additional pressure causes rupture of the metal.

Study of the stress-strain diagram of a metal helps to understand cold-working theory. In the elastic range between zero pressure and point *A*, Fig 10, the metal deforms uniformly with increasing pressure, according to Hooke's law. But at point *A* a great increase in strain (deformation) occurs for only a slight increase in pressure, or stress. This is the yield point. Metal that has been stressed past this point will retain the shape it had at time of pressure release. Between points *A* and *C* the metal is in the plastic range, but takes progressively more pressure to keep it moving. For example, if a piece of steel is cold worked until its length increases 0.100 in., the pressure required will be 61,300 psi, or well within the plastic range. If the process is interrupted, and it is again desired to cold form the metal, a new yield point of 61,300 psi must be surpassed before the metal will again flow.

The plastic range of a metal, say steel, can be changed markedly by varying just one of the constituents. Fig. 11 shows stress-strain curves for four steels with different carbon percentages. It will be seen that carbon content has a great effect on plastic flow.

Iron, or steel, flows much more readily in tension, as in drawing, than it does under compression, as in swaging. In other words, the material is much more ductile than malleable.

The phenomenon of strain hardening, that is, acquiring a higher yield point and becoming stronger under cold working,

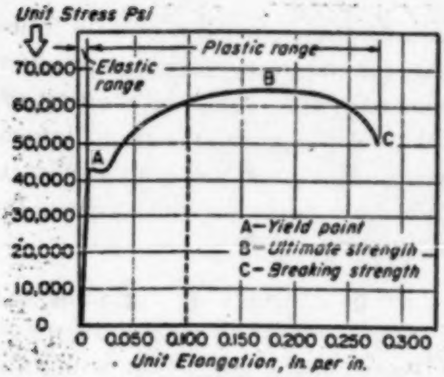


FIG. 10.
TO CAUSE plastic flow, the metal must be stressed past point A

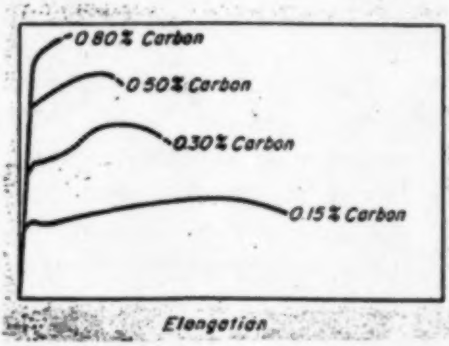


FIG. 11.
CARBON CONTENT of the steel has a marked effect on working pressure

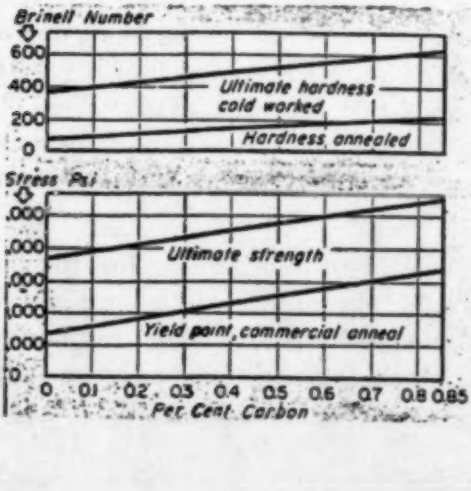


FIG 12.
YIELD POINTS of commercially annealed steels vary with carbon content

is valuable when extruding the shank of a bolt on a header. The piece will be stronger than a screw-machine product. On the other hand, this property may limit the amount of cold working that can be done on a product without annealing. This heat-treating operation allows the grains of metal to move about and realign themselves with the original lattices and regain the original yield point.

Theoretically, the yield point should be the same in compression and tension, but the changing area of the metal and tool friction in compression make yield points slightly different. In any compressive cold-working operation, more pressure will be required to move the last bit of metal than the first.

The lower the percentage of carbon, the better the plasticity in cold working, Fig 11. Yield points for commercially annealed steels, with their ultimate strength, are given in Fig 12. It will be seen that both the yield point and the ultimate strength increase directly with percentage of carbon. And when steel is cold worked, its strength and hardness increase, Fig 9.

Springback

The actual springback in steel is a very small percentage of the variation in size resulting from a cold-working operation. Take the pole shoe. The original stock was 0.545 ± 0.010 in. It is to be coined to a finished dimension of 0.530 ± 0.002 in. Hook's formula is $D = S \div E$, where D is the deformation in in. per in.; S is the stress, psi, and E is the modulus of elasticity (30,000,000 for steel).

By using the stress-strain formula, one can find the amount of springback when blanks of maximum and minimum thickness are cold-coined to 0.538 in. The reductions are: for minimum-thickness blank, 0.935%; for maximum-thickness blank, 4.5%.

For the 0.935% reduction, reference to Fig 9 shows that it is just past the yield point, and so we can use $S = 30{,}000$ psi. But for 4.5% reduction, S is 33,000 psi. Solving for D in these two cases gives 0.0011 in. per in. for the greater reduction and 0.0010 for the smaller reduction. The difference is 0.0001 in. per in.

Actually the variation will be much greater because of the different amounts of strain in the tools and press caused by differences in stock. Usually the actual variation is five to ten times the calculated springback. Therefore, to get correct sizing, use stop blocks to insure that the press will dwell at the same point each time. Start with blocks of the same thickness as the finished piece must be, try a few samples, and progressively thin the sizing blocks until the correct part thickness is obtained.

Bending. To bend a piece of metal and make it stay put, it is necessary to cause a metal flow of approximately 3% of the dimension being worked. In other words, if a flat blank is placed between curved dies for bending, and the thickness is not reduced by 3%, the piece will not retain the desired curve.

Pyramiding of Pressure. In sizing operations, an increase in pressure takes place at the center of the piece, because the metal here is surrounded by other metal and has no place to go. The tools deflect more at the edges. Net result is that the central portion is thicker than at the edges. To compensate for this condition, make the dies flat and size some parts, measure the difference in thickness at the center and the edges, and rework the outer section of the dies until satisfactory parts are secured.

Width-to-Thickness Ratio. Ultimate strength of the material and friction between the blank and the tools limit the extent of cold working of a piece. It has been found that friction becomes so great when the ratio of width to thickness exceeds 10:1 as to permit only a feathering of the edges.

Header Parts Made Faster

Distributor Insert. This piece, which receives the spark-plug wire, is required in enormous quantities. It is made of either copper or aluminum. The original setup involved the use of two double-stroke headers to make the piece in four steps. The first three operations were performed on the first machine, and the pieces were then transferred to a second hopper-fed machine to form the bead. The new method forms the bead at the same time that extrusion takes place. In second view, the bead has been started, and in step three it is completed. The angle that forms the bead must be placed on the punch holder. Small grooves in the carbide die hold the part while the punch is withdrawn.

Regulator Cores. Formerly these were made on automatic screw machines, but are now headed with an 85% saving in material. Furthermore, a more ductile metal is more easily staked.

The cores are made on a ⅝ in. progressive header in four steps, at the rate of 4080 pcs per hr. Under the head of the machined core there was a knurl which had to be replaced with a series of lobes on the headed article. These changes required a few alterations in assembly tools. However, the materials and labor costs saved by heading paid off in four months.

Extruded generator frame saves 2 lb of steel

In addition to saving metal, extrusion of the generator frame produces the hole to size so that no machining of the ID is required. In fact, the ID is more accurate than a bored one for roundness and straightness. Actually, extrusion replaces welding the seam, broaching the weld, boring the ID, and facing one end, as required for the previous frame. The cost savings are considerable.

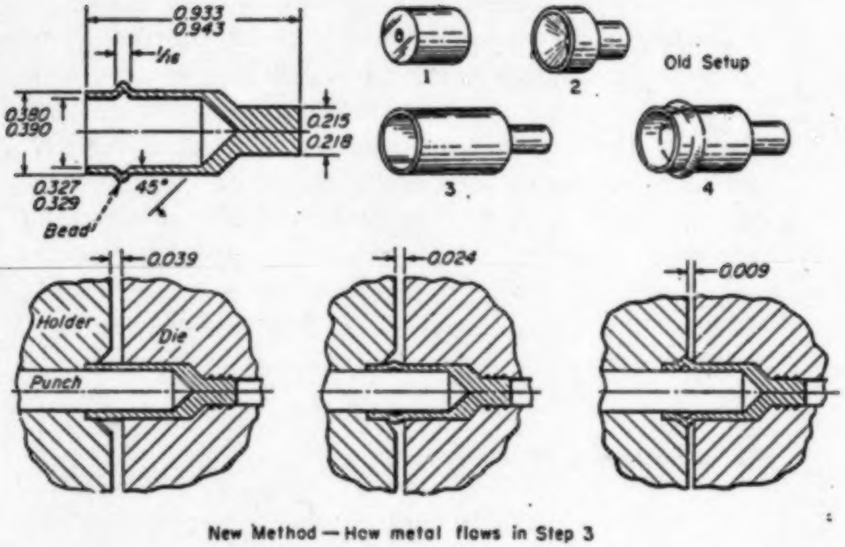


FIG. 13. BECAUSE OF THE BEAD for molding purposes, two machines were needed to head part by old method. Tool modifications enable part to be made on one header

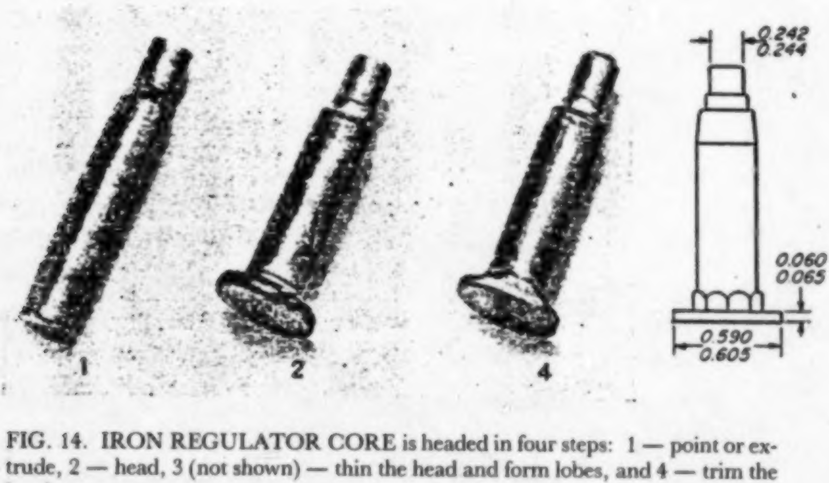


FIG. 14. IRON REGULATOR CORE is headed in four steps: 1 — point or extrude, 2 — head, 3 (not shown) — thin the head and form lobes, and 4 — trim the head

The generator frame was one of the first major cold-working jobs undertaken at Delco-Remy. Several experimental methods were tried in an effort to produce a frame with a smooth ID that would require no machining. Rotary swaging failed because some of the blanks were made extremely egg-shaped on the first blow and rotated with the dies. Ball sizing with an arbor bulged the metal ahead of the balls, instead of flowing lengthwise as required for sizing. An arbor-mounted roller was no better. Swaging with half-round dies was impractical, because the metal flowed to the center, and an arbor could not be used because of pyramiding pressure. Ironing on an arbor failed to keep the seam closed.

The first attempt at extrusion involved setting the formed cylinder in a die atop a collar and coming down with a stepped punch. Metal flowed upward, or opposite to the direction of applied pressure. However, this method produced stepped ID, which was not desired.

The present frame has ends with a tongue and groove blanked in them. Before blanking, the stock is grit-blasted to remove scale and to hold lubricant. Five operations are performed on the transfer press: cut off, notch, form to an oxbow shape so that the ends will fit square when formed up, U-form, and finish form using half-round dies.

Working the Walls

For the metal to take a permanent set, it is essential to work it at least 3% in a direction perpendicular to the applied pressure, as mentioned earlier. The original stock thickness is ⅜ in. Where the frame is not extruded, it is worked 9% by thickening the wall approximately 1/32 in. In the extruded area, the thickness is reduced to 3/16 in., or a 50% reduction.

Essential parts of the extrusion die, Fig. 18, are: the carbide extrusion ring, the arbor, and the collar. The extrusion ring has a 1° taper on the OD (smallest at top), and is pressed cold into three concentric shrink rings. These rings are fastened to the bolster with 8 heavy studs. This construction avoids pulling the die apart if the generator frame sticks in the lower die. Knockout pressure is about 40 tons.

The carbide ring is sand-blasted to roughen the surface in order to hold lubricant. This feature reduced the extrusion pressure to 175 tons, or approximately half that required with a polished ring.

The stripper assembly attached to the punch holder acts on the collar to strip the extruded frame off the high-carbon, high-chrome arbor. The knockout is cammed to follow the arbor, keeping the part on the arbor for stripping at a definite height above the die face, so that the work unloader can grasp the piece properly.

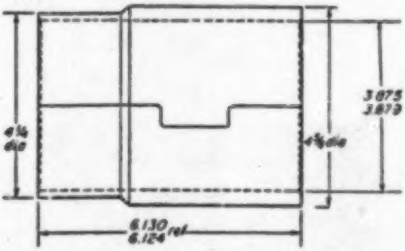


Fig. 15. BLANK FOR GENERATOR FRAME has a tongue and slot for locking purposes. After extrusion, seam does not open. Thus, conventional welding operation is avoided

It is possible to tear apart an arbor of the size indicated. Clearance is essential above the arbor, so that it can move faster than ram travel. Actually, metal movement in the thinned area is faster than ram travel, hence tension stresses are applied to the arbor in the extruding region by clamping action of the extruded moving metal. Thus, if the arbor could not float in limited clearance, it could be (and has been) torn apart. Other features of the arbor are: The end portion is

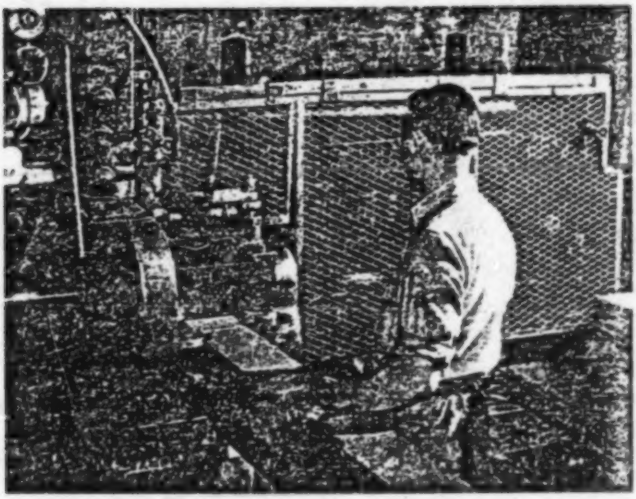


Fig. 16. GRIT-BLASTED STOCK is formed into a generator frame in five operations on a transfer press: blank, notch, oxbow, U-form and finish form in half-round dies

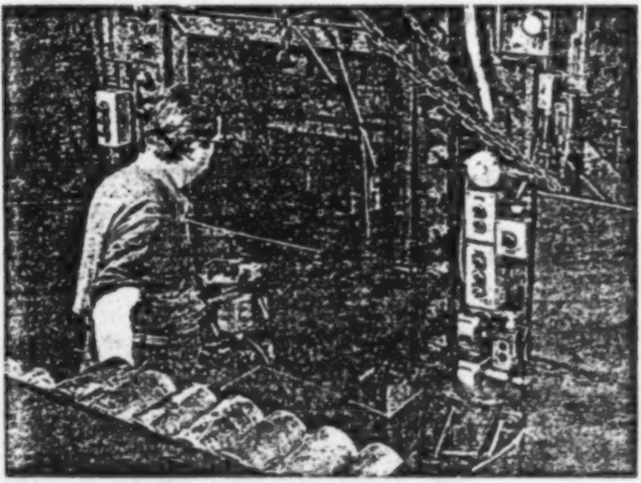


Fig. 17. PLASTIC INCLOSURE around throat of extrusion press keeps oil from flying. Operator puts frame in chute, and part is picked off by combination [illegible]der-unloader

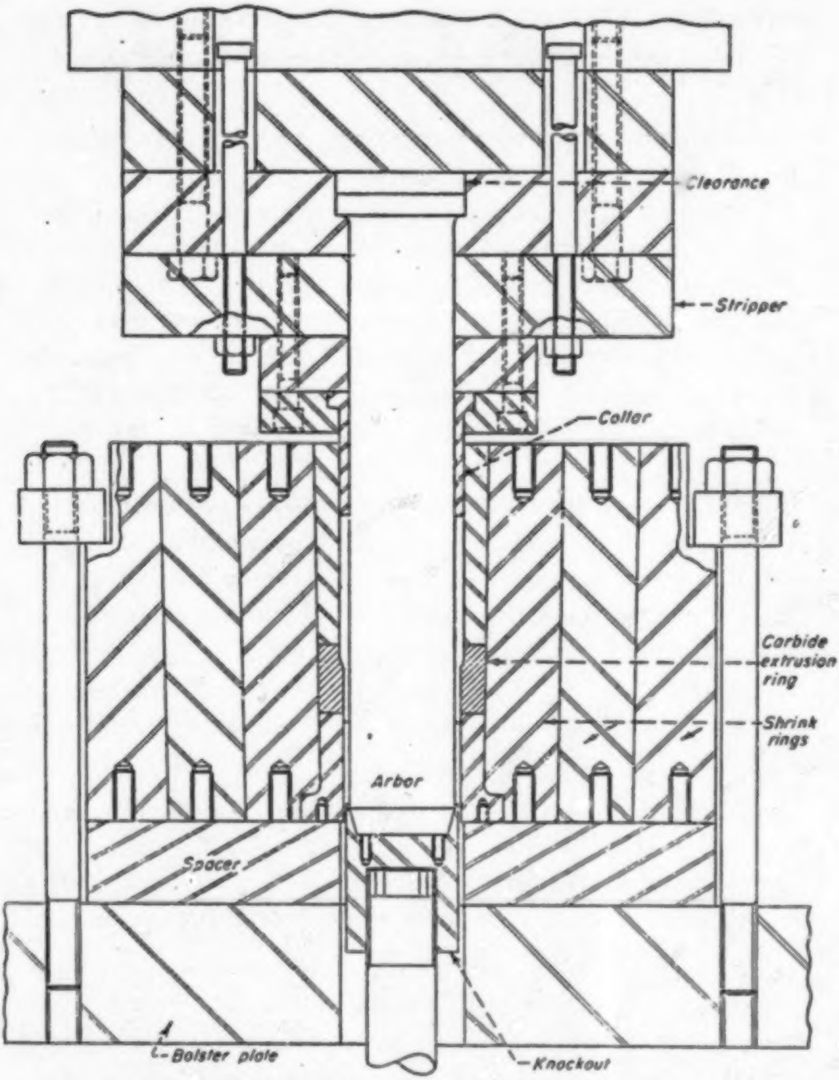


Fig. 18. CLEARANCE ABOVE THE ARBOR is essential when extruding the generator frame. Otherwise, metal flow rate may exceed ram speed, and the arbor could be torn apart

several thousandths larger than the middle portion to compensate for elastic compression during extrusion, and vent holes are drilled to permit trapped oil to escape. Presence of any trapped oil often accounts for a sharp increase in tonnage for filling out the desired shape in flat-swaging and extrusion jobs.

During the extrusion cycle, the wall thickness of the piece is first increased to ⅜ in. by upsetting action of the collar. This action occurs when the generator frame strikes the 45° throat in the extrusion ring. Before the metal can extrude, it must fill the annular space between the ring and the arbor, thereby properly sizing the ID of the part at the heavy wall section. A ⅛-in. land in the extrusion ring is used primarily for a gaging point for sizing the piece, and land of this length is not essential to proper extrusion.

Hollow shaft with extruded ends replaces solid one

For many years, Delco-Remy made its generator shafts on automatic screw machines. Now, instead of bar stock, the shaft is made from welded steel tubing. Both ends of cut-to-length pieces of tubing are reduced in diameter for the bearing fits by a series of extrusion operations. With the new construction, a considerable amount of metal is saved, and more rigidity is obtained in the shaft.

Tubing is produced on a combination roll-forming and welding machine. After cutting to length, the tubes are centerless ground to a tolerance of 0.001 in. in order to obtain a snug fit in work holders set into the dial of the presses.

The two ends of the shaft are extruded separately. Because of the tight fit in the dial, the operator uses a loading dial placed above and in front of the press dial. He drops the proper end of the shaft into the loading dial, and it indexes in time with the press dial. At the transfer point, a hydraulic ram pushes the piece from the loading dial into the empty work holder in the press dial below. As the press dial indexes from station to station, the press ram progressively extrudes the piece. One end receives three extrusions; the other end two extrusions. Note: the second end is extruded in a second press setup.

Extruded shafts fit so tightly in the dies that a hydraulic ejector is necessary. Dies have a tapered throat, 15° per side, and the balance of the hole is straight.

These are the operations performed on the two ends:

End A — Two extrusions and a shear. The first extrusion produces the larger diameter; the second extrusion makes the smaller diameter at the end. To produce an oil slinger, shearing pushes up metal at the end of the taper.

End B — Three extrusions are required because the reduction is too great to obtain the larger diameter in one pass, without buckling at the junction with the body of the shaft. Hence, the larger diameter is obtained in two passes. The third extrusion produces the step for roll threading, the metal being extruded to the thread pitch diameter. Shearing follows to produce a shoulder.

In all cases, the extrusion pressure amounts to only a few tons per operation because the shaft is hollow and metal moves easily.

Elongation of the shaft as the result of the several extrusion operations amounts to ¾ in. Wall thickness of the tubing is 0.083 in. Some thickening takes place at the extruded sections. In general, the thickness of the extruded sections is 0.090 in., which provides metal for grinding the bearing fits without weakening the shaft.

The splines on the generator shaft are another example of a cold-working operation. After all machining of the shaft is completed, the splines are produced by two fixed forming rolls and a ram pushes them through. The rolls have half-round profiles to contain the shaft and prevent its collapse. No arbor is used.

On the solid shaft, a knurl was used to hold pressed-on laminations on the shaft. In some cases, the knurled edges sheared the laminations and did not hold them.

The Woodruff Keyseat is pierced, or lanced, before grinding, leaving a strip of material that supports the key and prevents it from being forced too far into the shaft interior at assembly. This operation saves many thousands of dollars annually in respect to keyway gutters.

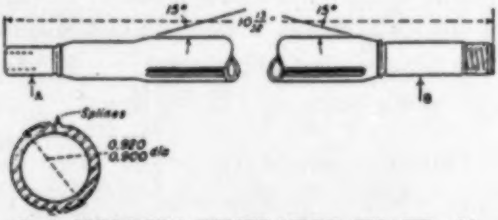


Fig. 19. A HOLLOW GENERATOR SHAFT with extruded ends saves considerable metal over a solid one, providing quick amortization of equipment cost

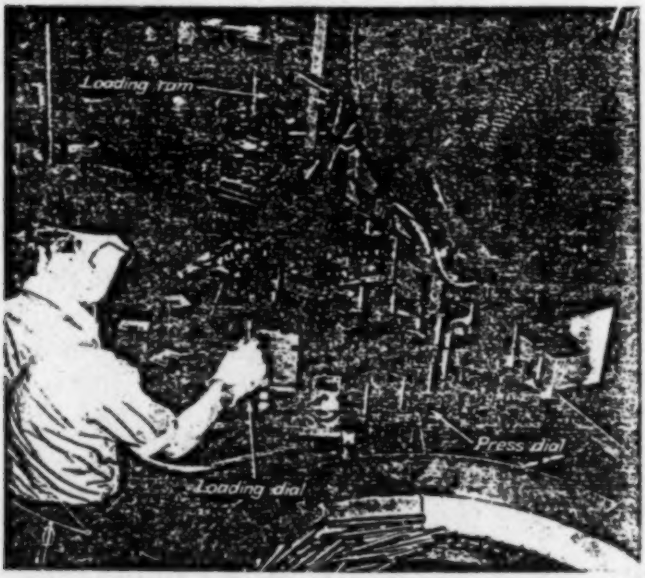


Fig. 20. GENERATOR SHAFTS must fit tightly in the dial of the extrusion press. Hence, a loading dial with hydraulic pusher is placed above the press dial

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
DEFENDANT'S ACCOUNTING TRIAL
EXHIBIT NO. A-48, TAB 3, P. 3

McCOY, GREENE & TeGROTENHUIS

October 6, 1955

General Motors Corporation
3044 West Grand Boulevard
Detroit 2, Michigan

Attention: Mr. G. H. Willits

Gentlemen:

This is to call your attention to U.S. Reissue Patent 24,017 reissued June 7, 1955 for "Method of Coating and Drawing Metal and Compositions Therefor" granted to John A. Henricks, a copy of which patent is enclosed.

It is our understanding that some of your company's drawing operations, including your bumper drawing operations, may come within the scope of the claims of this patent.

My partner and I recently acquired title to this patent and we are prepared to grant General Motors a non-exclusive license under it at reasonable royalty rates. We would like to discuss the matter with you at your convenience.

Very truly yours,

/s/ Wm. C. McCoy

TAT:MM

Encl: U.S. Reissue Patent 24,017

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
DEFENDANT'S ACCOUNTING TRIAL
EXHIBIT NO. A-48, TAB 3, P. 4

October 14, 1955

McCoy, Greene & TeGrotenhuis
Bulkley Building
Cleveland 15, Ohio

Attention of Mr. William C. McCoy

United States Patent Re. 24,017 — Hendricks — Method of Coating and Drawing Metal and Composition Therefor

Gentlemen:

This will acknowledge your letter to Mr. Willits, dated October 6, 1955.

We are investigating this matter and will write to you again as soon as the investigation is completed.

Very truly yours,

S.E. Ross
PATENT SECTION

SER:lr

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
DEFENDANT'S ACCOUNTING TRIAL
EXHIBIT NO. A-48 TAB 3, P. 5

McCOY, GREENE & TeGROTENHUIS

January 16, 1956

Mr. S. E. Ross
Patent Section
General Motors Corporation
3044 West Grand Blvd.
Detroit 2, Michigan

Dear Mr. Ross:

Re: U.S. Patent Re. 24,017

In accordance with your letter of October 14, 1955, we understand that you are investigating the above patent and its use by General Motors Corporation.

We would appreciate knowing when we can expect to hear from you so that we can discuss the matter with you.

If you have any questions, we will be glad to try to answer them for you.

Yours very truly,

/s/ Wm. C. McCoy Jr.

WCMJr:MB

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
DEFENDANT'S ACCOUNTING TRIAL
EXHIBIT NO. A-48, TAB 3, P. 6

January 20, 1956

McCoy, Greene, & TeGrotenhuis
Bulkley Building
Cleveland 15, Ohio

Attention: Mr. William C. McCoy, Jr.

Re: U.S. Patent Reissue 24,017

Gentlemen:

With reference to your letter dated January 16, 1956, my investigation indicates that the drawing compounds we use are proprietary materials purchased from outside vendors under the provisions of our Standard Purchase Order forms in which the vendor accepts any patent liability there may be from use of its material. Our vendors do not inform us as to the composition of the materials they sell us and, as a consequence, I am unable to determine whether or not Reissue Patent 24,017 presents any problem of infringement.

If you will supply me with information as to the plant or plants of General Motors at which the alleged infringement is supposed to have occured and supply me with the name or names of the vendors which supplied the drawing compounds which led to your infringement charge, I will be able to expedite my investigation. Will you please let me hear from you at your early convenience.

Very truly yours,

S. E. Ross
PATENT SECTION

SER:cpm

IN THE U.S. DIST. COURT FOR THE DIST. OF DEL. DEFENDANT'S ACCOUNTING TRIAL EXHIBIT NO. A-48, TAB 3, P. 7

McCOY, GREENE & TeGROTENHUIS

January 31, 1956

Mr. S. E. Ross
Patent Section
General Motors Corporation
3044 West Grand Blvd.
Detroit 2, Michigan

Dear Mr. Ross:

Re: U. S. Reissue Patent No. 24,017

Answering your letter of January 20, 1956, it is our understanding that General Motors Corporation is using the process invention of the subject patent in its bumper drawing operations and other metal drawing operations.

We understand that General Motors forms on the metal surface an integral iron salt that has a lower melting point than the metal, thereafter forms a meltable fixed film over said integral iron salt by coating the surface thereof with a film-forming, liquid composition containing a water-soluble organic binder that dries to a solid film, and a meltable, solid inorganic compound, and thereafter works the metal. Reference is made to claim 7 of the subject patent and to example XIX, column 15 of the patent.

In other words, we understand that General Motors Corporation phosphates the bumper stock to form an integral iron salt and then coats it with a soap and borax type drawing compound.

Inasmuch as the invention of the subject patent is directed to a process of working metal and not to particular drawing compounds purchased from outside vendors, the infringer is the one practicing the process; in the instant case, General Motors Corporation. We did not obtain our information from the vendors of the drawing compounds and prefer not to involve them.

Yours very truly,

/s/ Wm. C. McCoy, Jr.

WCMJr:MB

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
DEFENDANT'S ACCOUNTING TRIAL
EXHIBIT NO. A-48, TAB 3, P. 8

February 20, 1956

McCoy, Greene, & TeGrotenhuis
Bulkley Building
Cleveland 15, Ohio

Attention: Mr. William C. McCoy, Jr.

Gentlemen:

Following receipt of your letter of January 31, 1956, I have made a further investigation.

So far as I have been able to determine from information supplied so far by our vendors of the drawing compounds, we are not using any process, bath, or product covered by any valid claims of Henricks Reissue Patent 24,017. Further information as to composition of drawing compounds is being sought from some of our suppliers.

One of our suppliers has informed us that a material they sell for application to phosphated metal surfaces to assist in metal working simply consists of a mixture of soap and borax. This is mentioned since your letter refers to a "soap and borax type drawing compound." The supplier directs our attention to Singer patents 2,105,015 and 2,116,954 which disclose a metal working process comprising applying a phosphate or oxalate coating to the metal and thereafter applying a lubricant to the phosphate coating. This supplier states the soap-borax mixture they sell was known in the art long prior to the filing date of abandoned application Serial No. 665,905, filed April 29, 1946, as a lubricant in metal working operations. It is the position of the vendor that using an old soap-borax mixture as the lubricant in the Singer process is not a matter of invention. It is their position that the patent is invalid, especially if construed to cover use of this old material over a phosphate coating.

The materials we use are sold to us under the provisions of our standard purchase orders in which the vendor agrees to save us harmless of any patent liability from our use of the purchased material. We have called your letter charging infringement to the attention of our vendors and will advise you further after we hear from them.

Very truly yours,

S. E. Ross
PATENT SECTION

SER:cpm

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
DEFENDANT'S ACCOUNTING TRIAL
EXHIBIT NO. A-48, TAB 3, P. 9

March 12, 1956

McCoy, Greene, & TeGrotenhuis
Bulkley Building
Cleveland 15, Ohio

Attention: Mr. William C. McCoy, Jr.

Gentlemen:

This is with further reference to Henricks Reissue Patent 24,017.

Our investigation indicates that the drawing compounds we use on phosphated surfaces are proprietary materials purchased under the provisions of our standard purchase orders in which the vendor agrees to save us harmless of any patent liability from our use of the purchased material. Our suppliers of this class of material are: Metal Lubricants Co., 3211 South Wood Street, Chicago 8, Illinois; The H. A. Montgomery Company, 17191 Swift Avenue, Detroit 3, Michigan; and the Parker Rustproof Company, 2177 E. Milwaukee, Detroit 2, Michigan. We have called to their attention your letter charging infringement and suggest that you contact these companies directly if you feel that an infringement problem is presented.

Very truly yours,

S. E. Ross
PATENT SECTION

SER:cpm

In the United States Court,
For the Northern District of Illinois,
Civil Action No. ....

Devex Corporation, a Corporation of Ohio; William C. McCoy, 524 Bulkley Building, Cleveland 15, Ohio; and Theodore A. TeGrotenhuis, 524 Bulkley Building, Cleveland 15, Ohio. *Plaintiffs,* *vs.* General Motors Corporation, a Corporation of Delaware; and Metal Lubricants Co., a Corporation of Illinois, *Defendants.*	56 C 1912. (For Infringement of United States Letters Patent Reissue No. 24,017).

COMPLAINT.

The Plaintiffs, complaining of the Defendants, allege:

I.

This is a civil action for patent infringement. The jurisdiction of the Court in this action arises under the Patent Laws of the United States.

II.

Plaintiff Devex Corporation is an Ohio Corporation, with its principal office at 1296 Hall Avenue, Lakewood 7, Ohio; Plaintiffs William C. McCoy and Theodore A. TeGrotenhuis are citizens of the State of Ohio, with offices at 524 Bulkley Building, Cleveland 15, County of Cuyahoga and State of Ohio.

III.

The Defendant General Motors Corporation is a corporation organized and existing under the laws of the State of Delaware, and it is domesticated in Illinois and qualified as a foreign corporation to do business in the State of Illinois. This Defendant has several regular and established places of business in Illinois, including regular and established places of business in the City of Chicago and within the Northern District of the State of Illinois; and this Defendant has committed acts of infringement herein complained of in the Northern District of Illinois as well as elsewhere in the United States.

IV.

The Defendant Metal Lubricants Co. is a corporation organized and existing under the laws of the State of Illinois, and it has a regular and established place of business at 3211 South Wood Street, Chicago 8, Illinois. This Defendant has committed the acts of infringement herein complained of in the Northern District of Illinois.

V.

On March 4, 1952, United States Letters Patent No. 2,588,234 were duly and lawfully issued to John A. Henricks of Lakewood, Ohio for an invention in a method of coating and drawing metal. On June 7, 1955, Letters Patent Reissue No. 24,017 were duly and lawfully issued to John A. Henricks for the same invention.

VI.

By an assignment effective as of February 1, 1949, and dated August 22, 1955, the inventor of Letters Patent Reissue No. 24,017, John A. Henricks, assigned said patent to Plaintiff Devex Corporation. By an assignment dated September 10, 1955, Plaintiff Devex Corporation assigned said patent to Plaintiffs William C. McCoy and Theodore A. TeGrotenhuis. Plaintiff Devex Corporation, however, retained certain reversionary rights therein which it now has.

VII.

Except for certain rights retained by Plaintiff Devex Corporation, Plaintiffs William C. McCoy and Theodore A. TeGrotenhuis are the owners of Letters Patent Reissue No. 24,017.

VIII.

The Defendant, General Motors Corporation, has infringed and is continuing to infringe the Letters Patent Reissue No. 24,017 by drawing and deforming metal according to the process described and claimed therein. Defendant General Motors Corporation has been fully informed with regards to said patent and its infringement thereof, but has nevertheless continued to infringe the same.

IX.

The Defendant, Metal Lubricants Co., has promoted the infringement of Letters Patent Reissue No. 24,017 by Defendant General Motors Corporation by agreeing to hold Defendant General Motors Corporation harmless from any patent liability that may be involved in its use of the process claimed and described in said patent. Defendant Metal Lubricants Co. has been informed with regards to said patent.

X.

By reason of the infringement of the Defendants, Plaintiffs have been seriously damaged and injured.

Wherefore, Plaintiffs pray:

(a) For an accounting to establish their damages against each Defendant; that the damages so found be trebled; and for judgment against the Defendants according to their respective liabilities;

(b) For reasonable attorneys' fees unjustifiably caused them;

(c) For an assessement of costs against each of the Defendants; and

(d) For such other and further relief as may be required and appropriate in the premises.

Devex Corporation,
William C. McCoy, and
Theodore A. TeGrotenhuis,
By /s/ Frank H. Marks,
Frank H. Marks,
Lederer, Livingston, Kahn & Adsit,
120 South LaSalle Street,
Chicago 3, Illinois,
Attorneys for Plaintiffs.

/s/ Wm. C. McCoy,
Wm. C. McCoy,

/s/ T. A. TeGrotenhuis,
T. A. TeGrotenhuis,
524 Bulkley Building,
Cleveland 15, Ohio.
Of Counsel for Plaintiffs.

In the United States District Court, N.D. Ill.
(Caption—56-C-1912)
[TITLE OMITTED IN PRINTING]

ANSWER OF DEFENDANT GENERAL MOTORS CORPORATION.

Now comes the Defendant General Motors Corporation for its answer to the Complaint filed in the above entitled cause and states:

1. Defendant admits the allegations of Paragraph 1 of the Complaint, except that it denies that this Court has jurisdiction of this Defendant with respect to the cause of action alleged in the Complaint.

2. Answering Paragraph 2 of the Complaint, Defendant is without knowledge or information sufficient to form a belief as to the truth of the allegations therein set forth.

3. Answering Paragraph 3 of the Complaint, Defendant admits that it is a corporation organized and existing under the laws of the State of Delaware, and that it is qualified and licensed as a foreign corporation to do business in the State of Illinois, and that it has regular and established places of business in the State of Illinois and in the City of Chicago and within the Northern District of the State of Illinois. Defendant denies that it has committed the acts of infringement alleged in said Complaint in the State of Illinois, or in the Northern District thereof, or elsewhere in the United States.

4. Answering Paragraph 4 of said Complaint, Defendant is without knowledge or information sufficient to form a belief as to the truth of the allegations therein set forth.

5. Answering Paragraph 5 of said Complaint, Defendant admits that on March 4, 1952 United States Letters Patent No. 2,588,234 were issued to John A. Henricks of Lakewood, Ohio for an alleged invention in the method of coating and drawing metal, but denies that the same were

lawfully issued, and further admits that on June 7, 1955 United States Letters Patent Reissue No. 24,017 were issued to John A. Henricks, but denies that the same were lawfully issued and for the same invention.

6. Answering Paragraph 6 of said Complaint, Defendant is without knowledge or information sufficient to form a belief as to the truth of the allegations therein set forth.

7. Answering Paragraph 7 of said Complaint, Defendant is without knowledge or information sufficient to form a belief as to the truth of the allegations therein set forth.

8. Answering Paragraph 8 of said Complaint, Defendant denies each and every allegation therein set forth.

9. Answering Paragraph 9 of said Complaint, Defendant denies each and every allegation therein set forth.

10. Answering Paragraph 10 of said Complaint, Defendant denies all allegations therein set forth and denies that Plaintiffs are entitled to any relief therein prayed.

11. Defendant further answering said Complaint, avers that it is a resident of the State of Delaware and is not a resident of the judicial district in which this suit is brought and that it has not committed any act of infringement alleged in said Complaint within the State of Illinois, or within the Northern District of the State of Illinois, or within the judicial district in which this suit is brought, and avers therefore that venue of this action with respect to this Defendant is improper under Section 1400(b) of the United States Code Title 28, and that this Court is therefore without jurisdiction of this Defendant to hear and determine cause of action alleged in said Complaint, or to grant the relief demanded therein against this Defendant, and therefore moves that this suit and the said Complaint against this Defendant be dismissed on the ground of improper venue and for want of jurisdiction of the person of this Defendant.

12. Further answering said Complaint, Defendant avers that it has not infringed and is not infringing the aforesaid Reissue Patent No. 24,017.

13. Further answering said Complaint, Defendant avers that the aforesaid Reissue Patent No. 24,017 and all the claims thereof are invalid and void on the following grounds:

(a) That the applicant for said patent was not the original, first and sole inventor of the invention purported to be described and claimed in the said patent and that the said alleged invention was in all material and substantial respects and parts invented, known and used by others in this country, or patented and described in printed publications in this and foreign countries, before the invention thereof by the applicant for said patent;

(b) That the alleged invention purported to be described and claimed in said patent, in all material and substantial respects and parts were patented or described in printed publications in this or in foreign countries, or was in public use or on sale in this country, more than one year prior to the date of the application for the said patent in the United States;

(c) That the invention purported to be described and claimed in said patent was in all material and substantial respects and parts described in patents granted on applications for patent by others filed in the United States before the invention thereof by the applicant for said patent;

(d) That the applicant for said patent did not himself invent the subject matter sought to be patented in said Letters Patent;

(e) That before the alleged invention by the applicant for said Letters Patent of the subject matter described and claimed in said Letters Patent, the alleged invention thereof in all its material and substantial respects and parts was made in this country by others who had not abandoned, suppressed, or concealed it;

(f) That the differences between the subject matter sought to be patented in said Letters Patent, and the prior art are such that the subject matter of said Letters Patent as a whole would have been obvious at the time the alleged invention by the applicant for said Letters Patent was made to a person having ordinary skill in the art to which the said subject matter pertains;

(g) That said Letters Patent are invalid and void for failure to comply with Section 112 United States Code Title 35 in that the claims thereof fail to particularly point out and distinctly claim the subject matter which applicant regards as his invention in such manner as to clearly distinguish the same from the prior art;

(h) That said Letters Patent Reissue No. 24,017 are void on the ground that the alleged error in the original patent did not arise through error without any deceptive intention, and on the ground that the same are not for the same invention as the original patent.

14. Defendant hereby gives notice that it will rely upon, and offer in evidence at the trial of this cause, the following prior patents and publications in support of its defenses set forth in Paragraph 13(a)-(g), inclusive hereof.

United States Patents.

No. and Date.	
2,105,015	Fritz Singer January 11, 1938
2,116,954	Fritz Singer May 10, 1938
2,223,037	H. K. Ihrig November 26, 1940
2,258,309	John C. Zimmer October 7, 1941
2,350,491	B. F. Butler et al. June 6, 1944
2,421,543	James F. Cook June 3, 1947 and application therefore filed January 19, 1945
2,469,473	G. H. Orozco and J. A. Henricks, May 10, 1949 and application therefor filed August 2, 1943

2,470,062	R. A. Whitbeck May 10, 1949 and application therefore filed October 8. 1948 and also abandoned application referred to therein being Serial No. 625,113 filed October 27, 1945
2,530,837	G. H. Orozco and J. A. Henricks November 21, 1950 and application therefor, Serial No. 41,902 filed July 31, 1948, and also original application therefor Serial No. 497,117 filed August 2, 1943

British Patents.

496,866	Metallgesellschaft Aktiengesellschaft December 7, 1938
531,980	Metallgesellschaft Aktiengesellschaft January 15, 1941

Prior Publications.

Transactions of American Society for Steel Treating, issue of February 1933, article by Maurice Reswick, pages 181, 186-188.

German publication translated from Metallwirtschaft, vol. 21, pages 7-14, published 1942.

German publication translated from Stahl und Eisen, vol. 62, pages 968-972, published 1942.

Prior Public Use or Sale.

General Motors Corporation, Buick Motor Division, Flint, Michigan.

Gilron Products Company, Cleveland, Ohio.

The names and addresses of persons who may be relied upon as prior inventors, or as having prior knowledge of the invention of said Letters Patent Reissue No. 24,017 are the patentees of and/or applicants for United States Letters Patent, and their addresses so far as presently known to Defendant, are the addresses given in the said patents.

15. Defendant hereby gives notice that it will, at the trial of said cause, rely upon and offer in evidence the proceedings had in the United States Patent Office with respect to the application for and allowance of said Letters Patent Reissue No. 24,017, said original Letters Patent No. 2,588,234 and the abandoned application identified in said Letters Patent Reissue No. 24,017 as Serial No. 665,905, filed April 29, 1946, and all of the patents and publications referred to by the United States Patent Office in the said proceedings.

Wherefore, Defendant General Motors Corporation prays:

(a) That this suit and the Complaint herein be dismissed as to this Defendant for want of proper venue and for lack of jurisdiction of the person of this Defendant;

(b) That it be adjudged and decreed that this Defendant has not infringed said Letters Patent;

(c) That it be adjudged and decreed that the said Letters Patent are invalid and void;

(d) That the Complaint herein be dismissed for want of cause of action against this Defendant;

(e) That this Defendant have judgment against Plaintiffs for its costs and expenses, and its reasonable attorneys' fees, in this suit.

General Motors Corporation,
Davis, Lindsey, Hibben & Noyes,
By George N. Hibben,
332 South Michigan Blvd.,
Chicago 4, Illinois,
Its Attorneys.

Service and receipt of copy of Answer of Defendant General Motors Corporation is hereby acknowledged this 16th day of July, 1957.

Frank H. Marks.

IN THE U.S. DISTRICT COURT — N.D. ILL

[Title Omitted in Printing]

[Filed July 8, 1957]

ANSWERS OF DEFENDANT, GENERAL MOTORS CORPORATION, TO PLAINTIFFS' INTERROGATORIES OF MARCH 5, 1957

Now comes defendant, General Motors Corporation, by its duly authorized officer, and makes the following answers to plaintiffs' Interrogatories To Defendant General Motors Corporation, served March 5, 1957.

1. Interrogatory 1 was withdrawn by plaintiffs in open court on June 17, 1957 and hence no answer is required.

2. In response to Interrogatory 2, the bumper stock at the Chevrolet Spring and Bumper Plant of Chevrolet Motor Division of this defendant at Livonia, Michigan, at the Saginaw Street Bumper Plant and at the Pressed Metal Plant of Oldsmobile Division of this defendant at Lansing, Michigan, and at the Sheet Metal Plant of Pontiac Motor Division of this defendant at Pontiac, Michigan, is immersed in or sprayed with a phosphate coating bath prior to the drawing operation so as to form thereon a phosphate coating.

3. In response to Interrogatory 3, the bumper stock, at each location specified above, is immersed in or sprayed with a composition subsequent to being phosphated and prior to the drawing operation. This defendant has no knowledge of the constituent elements of the compositions used at each plant but is advised that the compositions contain soap in some form.

4. In response to Interrogatory 4, the compositions are dried on the bumper stock prior to the drawing operation.

5. In response to Interrogatory 5, this defendant has no knowledge of the matters inquired into but is advised that the compositions used at the designated Chevrolet Motor Division and Oldsmobile Division plants do not contain a solid inorganic compound and that the composition used at the designated Pontiac Division plant does contain a solid inorganic compound as sold or after drying.

6. In response to Interrogatory 6, Bonderlube 215 purchased from Parker Rust Proof Company is used at the designated Chevrolet plant, Drycoat D C 1471 purchased from The D.A. Montgomery Co. is used at the designated Oldsmobile plants and Bonderlube 246 purchased from Parker Rust Proof Company is used at the designated Pontiac plant.

7. In response to Interrogatory 7, Oldsmobile Division and Chevrolet Motor Division of this defendant have no such written specification or requirements. Pontiac Motor Division has a Process Specification, a copy of which is attached hereto, referring to Bonderlube 246 used in its bumper forming operation. This defendant has no other written specifications or requirements as to compositions containing soap in some form for use in the bumper drawing operations.

8. For answer to Interrogatory 8, see the answer to Interrogatory 7.

9. In response to Interrogatory 9, the answer is "No".

10. No answer is required to Interrogatory 10.

11. No answer is required to Interrogatory 11.

12. In response to Interrogatory 12, this defendant has no knowledge of the matters inquired into but is advised that Bonderlube 215 and D C 1471 used at the designated Chevrolet and Oldsmobile plants do not contain borax and that Bonderlube 246 used at the designated Pontiac plant does contain borax.

13. In response to Interrogatory 13, Mr. Charles A. McKenny is plant manager of the designated Chevrolet plant, and Mr. William L. Kelley is plant superintendent of the designated Pontiac plant. Mr. Robert M. Scott is plant superintendent of the Oldsmobile Saginaw Street Bumper Plant and William R. Freeman is plant superintendent of the Oldsmobile Pressed Metal Plant.

14. In response to Interrogatory 14, the persons specified in answer to Interrogatory 13 are familiar with the bumper drawing operations performed at their respective plants and appear to be qualified to testify relative thereto.

Charles A. Chayne

State of Michigan)
) ss.
County of Macomb.)

On this 3rd day of July, 1957, personally appeared before me, a Notary Public, in and for the County of Macomb, State of Michigan, Charles A. Chayne who made oath that he is a duly qualified Vice President of General Motors Corporation, a Delaware Corporation, that he has authority to execute this affidavit, that he has made said answers on the basis of information supplied him by employees of said corporation and supplied said employees from outside sources, and that said answers are true to the best of his knowledge and belief.

Julia A. Northup
Notary Public

[Certificate of Service Omitted in Printing]

IN THE U.S. DIST. CT., N.D. ILL.

[Title Omitted in Printing]

[Filed February 4, 1959]

PLAINTIFFS' MOTION TO CONSOLIDATE FOR TRIAL WITH CIVIL ACTION NO. 57 C 892, DEVEX CORP. ET AL. V. HOUDAILLE INDUSTRIES, INC.; AND BRIEF IN SUPPORT THEREOF

MOTION TO CONSOLIDATE

Plaintiffs hereby move under Rule 42 that the above case be consolidated for trial with Civil Action No. 57 C 892.

BRIEF IN SUPPORT OF MOTION

The subject motion is addressed to the Court's discretion under Rule 42.

The above action and civil action No. 57 C 892 have common questions of law and fact in that both involve the validity and infringement of Henricks Reissue Patent 24,017. There are no other issues. The plaintiffs in each action are the same. While the defendants are different, the nature of the actions are such that consolidation will conserve judicial time and the time and effort of all parties.

Plaintiffs, therefore, respectfully request that the above action be consolidated with Action No. 57 C 892.

DEVEX CORPORATION,
WILLIAM C. McCOY and
THEODORE A. TeGROTENHUIS

By /s/ Frank H. Marks

Frank H. Marks
Lederer, Livingston, Kahn & Adsit
120 South LaSalle Street,
Chicago 3, Illinois
Attorneys for Plaintiffs

[Acknowledgment of Service Omitted in Printing]

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEFENDANT'S ACCOUNTING TRIAL EXHIBIT NO. A-9 (V.M. DARSEY DEPOSITION TAKEN BY PLAINTIFFS ON SEPTEMBER 14, 1960 IN DEVEX v. GENERAL MOTORS ET AL, NO. 56 C 1912, NORTHERN DIST. OF ILL.)

[5]* service; served as technical director, research director of the corporation; president for five years, and now vice-president.

MR. MC COY: Would you mark this as Darsey and McVey Deposition Exhibit No. 1.

(A document entitled "Reduction in Plating Cost by Use of Flat-Polished and Phosphate-Coated Steel" was marked Exhibit 1 by the reporter.)

Q Will you please identify Deposition Exhibit 1 and tell me what it is, if you can.

A This is a copy of a paper that Mr. McVey and I presented at the American Electroplaters' Society Convention. I believe it was held in Boston.

I might add that I don't have the original paper that was presented at this convention, and that in general the article appears as we presented it.

It is quite common that at that time they had a lady that took the text of the different talks as they were given, and to me this appears to be about the way we presented it.

MR. DICKEY: Can we put the date of that meeting in there, the date of presentation?

MR. MC COY: In answer to interrogatory 31, plaintiff, or General Motors, has already admitted that this article was presented at the 37th Annual Convention of the American Electroplaters' Society, which was held June 12 to [6] 15, 1950, at Boston Massachusetts.

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* Deposition of Transcript Page.

Q (By Mr. McCoy) These are the correct dates?

A Yes.

Q And you wrote this article and presented it in cooperation with Mr. H.J. McVey; is that correct?

A That's right.

Q And would you identify Mr. H. J. McVey? Who is Mr. H. J. McVey?

A He is the gentleman that is present here.

Q I mean, who does he work for?

A He works for the Parker Rust Proof Company.

Q What is his position there?

A Manager of New Products.

Q Now, if you will turn to the last page of your article, you will see a paragraph which is entitled "Acknowledgement." Do you see that paragraph?

A Yes, sir.

Q Can you tell me who Mr. E. E. Murray, of Murray-Way Corporation, Detroit, Michigan, is?

A Well, that's Mr. Murray, of Murray-Way. I assume he is president and either owner, full owner, or at least part owner of Murray-Way.

Q What does Murray-Way Corporation do?

A In those days, manufactured equipment for flat-polishing of steel.

* * *

* * *

[10] detail what you considered the old method as opposed to the flat-polished method.

A The old method consisted of forming the bumper part from mill-finished stock and polishing it afterwards and prior to plating.

Q So that the bumper was formed and had various curved contours and then was polished?

A Right.

Q And then was plated?

A Right.

Q Can you describe what this flat-polishing method was?

A The flat-polishing method consisted of polishing the strip steel in the flat and forming the bumper parts therefrom.

Q And then when were the bumpers plated?

A Followed by plating.

Q Prior to publicaton of this article, how many flat-polishing installations had you inspected, if you can recall? Why don't you just give the names of the installations you can recall? I am not interested in numbers.

A This is about the first.

Q What do you mean by "this"?

A Well, this method of producing bumpers. I don't recall if we had any other particular installations at that time. This is a new development.

Q On the basis of what installation did you write this article? What installation are you talking about? Where was it?

[11] A Well, this is one that would be in an automobile plant.

Q Which automobile plant?

A Olds.

Q And where is this plant located?

A In Lansing.

Q And what is the title of the plant in Lansing?

A Olds Motor Works, division of General Motors.

Q And prior to publicaton of this article, prior to the presentation of this paper, I should say, had you inspected any other bumper-forming installations utilizing this flat-polishing process?

A In my instance, no.

Q Do you happen to know whether Mr. McVey had?

A I can't answer that.

Q Do you happen to know whether Mr. Zimmerman, to whom you made an acknowledgement, was familiar with a flat-polishing installation?

A Well, I can't answer that for Mr. Zimmerman.

Q Do you know how Houdaille-Hershey manufactured their bumpers at this time?

A Not to my knowledge, I wouldn't know exactly how they manufactured their bumpers.

Q How do you think they manufactured their bumpers at the time you wrote this article?

MR. SHERMAN: I object to that as being purely

* * *

[16] MR. DICKEY: This thing doesn't mention the patent in suit or the invention of the patent in suit or anything else. I don't see what you are after, what the relevancy is.

MR. MC COY: Why don't we get an answer to the question that's unanswered at the present time, to which you have objected, and then I can pursue another line, perhaps, and bring the rest of this out.

Would you repeat the question?

(The question was read by the reporter.)

MR. DICKEY: Is there anything in there that you say isn't true that you want to repudiate?

A Well, we mention the subject of cost per square foot polishing bumpers, flat-polishing, versus the old or contour polishing; and the amount of savings that is mentioned there is information that was available at that time from estimates and engineering studies, and I have no way of knowing whether that figure was actually achieved or any more about it than just that. They were simply obtained from studies that were made, and those were the estimates that we had at that time, and I don't think there is any other thing in there that I can recall. The article speaks for itself.

Q Your testimony had reference to the fifth paragraph on the first page of the article, reading: "Production experience in a large automobile plant revealed a polishing cost of 0.6 cents [17] per sq. ft. for bumpers manufactured from flat-polished and phosphate-coated steel against a cost of 9 cents per sq. ft. for contour-polishing after forming." Is that not correct?

A Correct.

Q And are you saying that these figures are not correct?

A Oh, no. I make no statement to that effect. I simply am trying to point out that the basis that these figures were obtained were from engineering studies of this type of equipment versus the old type.

Q Who made these engineering studies?

A Mostly Murray-Way, the seller of the equipment.

Q Were these studies made in the ordinary course of the Murray-Way business, as part of their business procedure?

A That's a service they provide in the sale and promotion of their equipment.

Q They are reliable studies, aren't they?

MR. HIBBEN: How would this witness know about the reliability of Murray-Way studies?

MR. MC COY: We relied upon them in publishing his article.

MR. HIBBEN: I rely on a lot of hearsay. That is not good evidence.

Q (By Mr. McCoy) Back to my question. Weren't these studies by Murray-Way, didn't you consider them reliable?

A I would consider them as I would any other engineering and [18] design estimates for this type of operation.

Q What does that mean?

A Simply means that you do the best with what you have got at the time.

Q Didn't you think that these studies were the best evidence you had at the time as to the cost comparison between the flat-polishing and the polishing after forming?

A I had no idea of it. I had to rely on their estimate of it.

Q I appreciate that. But didn't you think that this was the best evidence you could get, the best information you could get, for the purposes of your article?

A Well, it was the information available at that time, as I previously stated. It is based on engineering design studies. Certainly didn't get it from the Saturday Evening Post.

MR. DICKEY: Bill, how do you relate this to your patent?

MR. MC COY: May I inquire more of the witness?

MR. DICKEY: Sure. Go ahead.

Q (By Mr. McCoy) I believe you have testified that the flat-polishing operation which you studied in preparation for this article was a bumper-forming operation at an Oldsmobile bumper drawing plant at Flint, Michigan. Is that correct?

MR. HIBBEN: May I have that question?

(The question was read by the reporter.)

[19] Q (By Mr. McCoy) Lansing, Michigan.

A It was Lansing.

Q Then my statement is correct, isn't it?

A It is correct if it pertains to Olds.

MR. HIBBEN: Now, wait a minute. You asked the witness to testify. He testified about Murray-Way for these particular cost figures. Do you mean the entire article, or what parts of the article? That last statement cannot be true with this matter of cost with Murray-Way. I don't want to impede your examination, but I don't want statements to go on the record that are not in accordance with the prior testimony.

MR. MC COY: Well, the witness was familiar with a flat-polishing bumper-drawing operation.

Q (By Mr. McCoy) Is that not correct?

A That's right.

Q And the operation was an operation being conducted at the Olds plant at Lansing, Michigan; is that not correct?

A Yes.

Q And that is the only flat-polishing bumper drawing operation you personally inspected prior to the presentation of this article?

A That's right.

* * *

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEFENDANT'S ACCOUNTING TRIAL EXHIBIT NO. A-9 (H.J. McVEY DEPOSITION TAKEN BY PLAINTIFFS ON SEPTEMBER 14, 1960 IN DEVEX v. GENERAL MOTORS ET AL, NO. 56 C 1912, NORTHERN DIST. OF ILL.)

* * *

[34]* Q Well, now, with respect to this operation at Lansing, Michigan, and the steps that you finally recommended, as I understand your testimony, you recommended it generally, but the specific procedure was adopted at Lansing. Is that correct?

A Yes.

Q And the steps — I hope I can repeat them correctly — you start with your steel, you flat-polish it, you clean it, then you apply a bonderite coating?

A Of course, first, you clean — it is a five-stage operation: clean, rinse, bonderize, rinse, and lubricate.

Q Did you recommend a specific lubricant?

A We had no desire to recommend a specific lubricant in any case. At that time we had a policy of not recommending any particular lubricant. Actually, the lubricant in use was supplied by H.A. Montgomery.

Q Do you know what that lubricant was? This is the lubricant [35] they used at the Lansing, Michigan, plant of Olds.

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* Deposition transcript page.

A It was one that H.A. Montgomery recommended at the time. I haven't the slightest idea what it was.

Q Do you know the difference between a dry film and wet film lubricant?

A I have my own definition. It may not be the same as yours.

Q Would you give me your definition?

A My definition of a dry lubricant is one which is dry to touch when ready for use; and a wet one is one which is oily to touch. The composition may be 'most anything.

Q Do you recall whether they used a dry film or wet film lubricant at this bumper-drawing operation at Lansing, Michigan?

A The film was applied wet and was dried.

Q Would you call that a dry film lubricant by your own definition?

A According to my definition, yes. But it has no reference whatever to the composition of the lubricant.

Q I appreciate that fact.

A I don't know what it was.

Q It was dry to the touch?

A It was dry.

Q As presented to the press?

A That's right.

Q And what period of time are we talking about here?

A 1949-50.

Q Do you know when this process was adopted, approximately when [36] it was adopted, at the Olds plant at Lansing?

A I believe it was the model 1950 year, which would be sometime around August, September, October.

Q Of '49?

A Yes. That is a matter of record.

Q When you say it is a matter of record, how would I find out, if I wanted to, what they were doing there?

A You might have to ask General Motors. In other words, it is ten years ago, and some of those things I didn't mark on my calendar, shall we say.

MR. HIBBEN: I think the record ought to show an objection to this examination on this Oldsmobile work, because it is prior to the date of the issuance of the patent. There can't be any charge of infringement there. Again, it is entirely irrelevant to these issues.

Q (By Mr. McCoy) Now, you were present during the deposition of Mr. Darsey when Mr. Dickey made a statement as to the interest or relationship of the Parker Rust Proof Company to the litigation in which this deposition is being taken; is that correct?

A Yes.

Q And you understand that Parker Rust Proof does have an interest in the outcome of this litigation; is that correct?

A Only as —

Q (Interposing) Mr. Dickey stated it.

[37] A I heard Mr. Dickey's statement, and I'll have to accept that as correct.

MR. MC COY: Mr. Dickey, is it a fair statement to say Parker Rust Proof does have an interest in the outcome of this litigation?

MR. DICKEY: The whole thing is spread on a deposition you took previously, Bill, the whole relationship.

Q (By Mr. McCoy) I direct your attention to the first page of this Deposition Exhibit 1 and to the first paragraph on this first page. Now, within your present knowledge, are the statements made in this first paragraph true and correct?

A Repeat that, please.

MR. MC COY: Would you repeat the question, please.

(The question was read by the reporter.)

A I think so.

MR. DICKEY: Wait a minute. What do you mean?

A I mean, "Metal polishing and buffing account for a substantial part of the cost in the production of electroplated coatings." That certainly is true, or was true at that time. And a great amount of research has been directed towards reducing these costs, that a substantial part of that cost was due to the shape of the article.

Q (By Mr. McCoy) How about the second paragraph?

A I think that's substantially correct, yes.

Q All right. The third paragraph?

[38] A That's true.

Q The fourth paragraph?

A I have no argument with that statement.

Q It is true, isn't it?

A Yes.

Q The fifth paragraph?

A Your question is, as I remember, as to my present-day knowledge. I have no present-day knowledge of costs as they are applied today. The figures used here were not obtained from anybody's books but was information which I obtained by contact with people who should have knowledge of costs involved. And we will have to classify it as hearsay, although I would believe it to be true.

Q You say information obtained from people who should have had knowledge. Will you enlarge on what you did here to get these figures?

A Well, let's put it this way: I was in a position to be in contact with the various people who were using flat polishing. That was not in just the Olds Motor plant, but in other plants as well.

Q Can you name some of these other plants?

A Standard Steel Spring, Houdaille-Hershey. I can't quite remember whether Electro Autolite Company was into it at that time or not. In other words, there were five different installations or six started in '50 or '51. I have forgotten [39] exactly, but there were installations prior to this.

Q Just for the record, could you identify those installations at Standard Steel Spring? Was that at Coroapolis? And Houdaille-Hershey, where was that? Where were their installations?

A I don't know whether Houdaille-Hershey was operating in all plants at that time or not. Mr. Zimmerman was in charge of getting that operation in progress. It is too long ago to be accurate.

Q Did you ever visit a Houdaille-Hershey installation in this period prior to the presentation of this paper?

A That's a question I can't answer accurately. I have the feeling I did, but I'm not sure.

Q What installation do you have a feeling of visiting?

A Well, there is a possibility of Huntington and also of Detroit Bumper.

Q You talked of the Electric Autolite. Where would that installation be?

A That would be in Sharonville, Ohio.

Q Before I diverged a bit, you were discussing the way in which you gathered the figures that appear in paragraph —

A (Interposing) All those people could be a source of part of the information in one way or another. I can't identify any particular person or plant as such.

* * *

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEFENDANT'S ACCOUNTING TRIAL EXHIBIT NO. A-9, ITEM 1 (DARSEY AND MCVEY DEPOSITION EXHIBIT NO. 1)

REDUCTION IN PLATING COST BY USE OF FLAT-POLISHED AND PHOSPHATE-COATED STEEL

H.J. McVey and V.M. Darsey
Parker Rust Proof Company, Detroit, Mich.

INTRODUCTION

Metal polishing and buffing account for a substantial part of the cost in the production of electroplated coatings. Much research has been devoted to the problem of reducing polishing costs, with the result that numerous automatic machines are in use for polishing formed articles. However, the shapes and contours of many formed articles are such that a polishing machine will only accommodate a single part.

Recent developments favor the automatic polishing of steel in the flat followed by phosphate coating and lubrication to protect the polished surface during the forming operation. Flat-polishing of steel is now new; but phosphate-coating of polished steel to prevent scratches and die marks in the forming operation is a recent commercial application. The saving from flat-polishing and phosphate-coating of steel before forming instead of polishing after forming is sufficiently large that most manufacturers of automobile bumpers have changed to this method.

Demands by the plating industry have resulted in some steel mills producing bright-finished steel. Any scratches in steel due to shipping, handling, or forming would have to be removed prior to plating. Phosphate coating and lubrication will also serve to protect the finish of such steel during manufacturing and handling operations.

COST REDUCTION

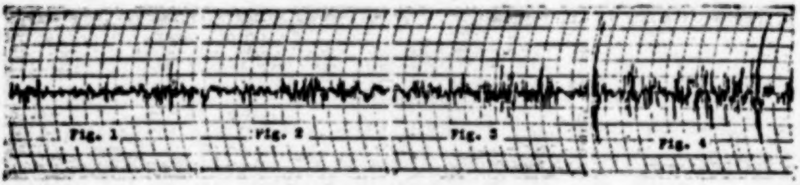
Polishing Cost

Automatic polishing of sheet steel in the flat is considerably more economical than the polishing of formed articles. Overhead cost is reduced in flat polishing by the elimination of expensive equipment changes, due to yearly or model changes, for formed or fabricated articles.

Production experience in a large automobile plant revealed a polishing cost of 0.6 cents per sq ft for bumpers manufactured from flat-polished and phosphate-coated steel against a cost of 9 cents per sq ft for contour-polishing after forming.

Forming Cost

By insuring a uniform and continuous film of lubricant on the surface and thereby reducing metal-to-metal contact, additional savings are obtained in the forming of automobile bumpers. These savings may be classified as follows.



FIGS. 1-4. — Effect of cleaning method on phosphate-coating reaction with steel flat-polished with 400-grit belt. Fig. 1, as-polished steel, RMS reading 9 μ in; Fig. 2, after cleaning in alkali containing a water and metal conditioner, treating with spray Bonderite, and stripping of the Bonderite coating, RMS reading 11 μ in; Fig. 3, after same treatment as in Fig. 2 except that the Bonderite coating was applied by immersion, RMS reading 13 μ in; Fig. 4, after same treatment as in Fig. 3 except that the alkaline cleaner contained no conditioner, RMS reading 26 μ in

1. Lower die cost
2. Less down time on presses.
3. Increased production
4. Fewer rejects

FLAT POLISHING

The polishing operation is accomplished by passing the steel sheet through a series of units in which abrasive belts with various sizes of grit produce the desired finish. Equipment is available for flat-polishing of steel to a finish of 8-12 μin (0.2-0.3μ). Two methods, wet and dry polishing, are used commercially. In the wet method, a lubrication agent is employed in the polishing operation, whereas in the dry method, no lubricant is used.

CLEANING PRIOR TO PHOSPHATE COATING

Removal of polishing compound and metal dust is essential before a suitable phosphate coating can be obtained on polished steel. In addition to being thoroughly clean, the surface must be conditioned to promote the formation of a dense and adherent coating that affords maximum protection in the forming operation. In general, spray or brush-scrubber cleaning is superior to immersion cleaning. The cleaning of the polished steel influences the form of the phosphate coating and the resultant appearance of the electroplate finish; it should be such that the phosphate reaction with the polished steel surface does not materially increase its roughness.

The effect of cleaning is shown by the following tests made on steel samples flat-polished with 400 and 320 grit. The Bonderite* coating was removed from all samples by electrostripping in alkali solution to reveal any change in roughness of the polished steel surface. Note the slight change in roughness of the 400-grit steel in Figs. 2 and 3 and the substantial increase in roughness in Fig. 4. Proper selection of cleaning materials is shown to prevent increasing the roughness of the polished steel surface by phosphating. The roughness imparted by the cleaning procedure in Fig. 4 was sufficient to cause rejection of the plated bumper. Also note the tendencies of the Bonderite treatment to reduce the surface roughness of, or level, the 320-grit finished steel in Figs. 6 and 7 and to increase the roughness in Fig. 8.

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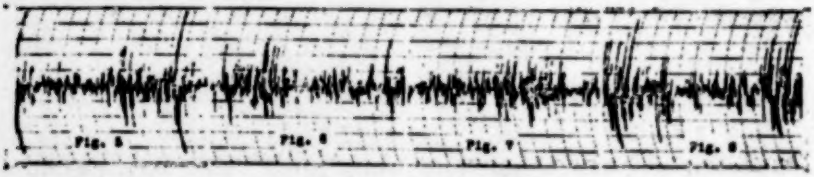
* Registered trade mark, Parker Rust Proof Company.



FIGS. 5-8. — Effect of cleaning method on phosphate-coating reaction with steel flat-polished with 320-grit belt. Fig. 5, as polished steel, RMS reading 25 μ in; Fig. 6, after cleaning in alkali containing a water and metal conditioner, treating with spray Bonderite and stripping of the Bonderite coating. RMS reading 24 μ in; Fig. 7 after same treatment as in Fig. 6 except that the Bonderite coating was applied by immersion, RMS reading 22 μ in; Fig. 8, after same treatment as in Fig. 7 except that the alkaline cleaner contained no conditioner, RMS reading 26 μ in

PHOSPHATE COATING

Several types of phosphate coatings[1] are available for different applications, among them types for corrosion resistance, wear resistance, and paint bonding[2]. The type used for the drawing operations considered here, as distinguished from the type used for deep-drawing operations is basically the same as for paint bonding. However, its structure is modified by the special cleaning procedure already described.

The treatment is usually carried out in automatic equipment and follows the polishing and cleaning operation. Conventional spray and immersion Bonderite materials may be used to produce satisfactory coatings.

LUBRICATION OF PHOSPHATE-COATED STEEL

The essential requirements of the lubricant are that it possess adequate film strength to withstand the desired forming operation and that it be removed satisfactorily in the cleaning operation. Dry- or wet-type lubricants may be used over Bonderite-coated steel in the forming operations. Soap-base lubricants, applied in an aqueous medium and dried, have proved a great convenience and are usually preferred to wet lubricants.

CLEANING AFTER DRAWING

Following the drawing operation, the lubricant and Bonderite coating are removed by normal cleaning procedures before plating.

APPLICATIONS

Automobile bumpers are being manufactured from flat-polished and Bonderite-coated steel. Tests are in progress on the manufacture of grilles and other automotive parts by the same procedure. The process is also being investigated for the manufacture of painted articles which are required to have a finish of high lustre.

SUMMARY

Flat-polishing of steel is more economical than polishing after forming. To protect polished steel surfaces, Bonderite with a suitable lubricant is used to prevent formation of scratches and other surface imperfections during the forming operations. Automobile bumpers are being produced by this procedure, and the economies resulting from this method of manufacture suggest its application to other electroplated articles.

ACKNOWLEDGMENT

We wish to thank Mr. E.E. Murray of Murray-Way Corporation, Detroit, Mich.; Messrs. C.E. McDowell, E.F. Strefling and U.J. Forsyth of Olds Motor Works, Lansing, Mich.; and Mr. A. Zimmerman of Houdaille-Hershey Corporation, Detroit, Mich., for their assistance in the preparation of much of the data in this paper.

LITERATURE CITED

[1] V.M.Darsey and Walter R. Cavanaugh, Trans. Electrohem. Soc. *91*, 351(1947).
[2] V.M.Darsey, Proc, Am. Electroplaters' Soc. *33*, 129 (1946.

DISCUSSION

MR. DONALD H. SCHANTZ (Michigan Bumper Corporation, Grand Rapids, Mich.): Have phosphate coatings been applied to hot-formed spring-steel bumpers?

MR. McVEY: The answer is "no", mainly because the temperature of the hot-forming operation is so high that the Bonderite film would be destroyed.

MR. C.A. ARMITAGE (Oldsmobile Division, General Motors Corporation, Lansing, Mich.): We would like to endorse highly everything that Mr. Darsey has said. However, we are a bit concerned about the fact that although we use PR plating, we do not completely fill some of the scratches that are formed during flat-polishing. We make Brush Surface Analyzer determinations on flat-polished pumper steel before it is cleaned and Bonderized, and we find the exceptional surface finish of the order of 12-15μ in of which he has been talking.

Is there any evidence that the Bonderite coating is not removed completely from deep scratches by anodic and cathodic electrocleaning?

MR. McVEY: I don't think we have run into that. There is no reason why it should not be readily removed in the reverse-current-cleaning and pickling operations, and my own work seems to confirm that. It is natural when you polish in the direction of rolling, as you do in the polishing of bumper steel, that steel defects will in some cases be opened up. It may be that this is part of the problem instead of the cleaning. I would not want to make that statement too hard and fast at the moment.

MR. ARMITAGE: We have found, and would like to have confirmed definitely, that some lubricants are almost impossible to put on flat-polished steel unless it has been properly Bonderized. On the other hand, sometimes when our lubricating equipment is not working too well, we have yet been able to do a good job of drawing with good Bonderite and a minimum of lubricant. That would lead one to believe that there might be a possiblity of eliminating the lubricant coating, doing a better job of Bonderizing, and using it as a draw lubricant.

MR. McVEY: Our experience has been that soap as a lubricant aids the Bonderite coating in forming operations. The phosphate coating itself may serve as a lubricant; however, in the manufacture of numerous parts, the use of a supplementary lubricant is advisable.

MR. AUSTIN FLETCHER (Enthone, Inc., New Haven, Conn.): Most bumpers that I have seen have one or two contours; today most of them come around the fender. Does the phosphate coating prevent the metal from showing an orange-peel effect? I plate small stampings, and would like to know how you overcome the orange-peel effect.

MR. McVEY: Unfortunately, we can make no claim for the elimination of orange peel. Orange peel is a characteristic of the steel itself when you stretch it, and as such is very difficult to minimize. Where there is compression, there is no orange-peel; I have seen large flat 0.125-inch thick steel blanks drawn to a tube over a foot long without annealing and without any intermediate operation except Bonderite and lubrication. However, when you speak about drawing flat-polished steel beyond the point where orange peel develops due to the quality of steel, phosphating offers no help whatever.

MR. G.B. HOGABOOM: Phosphating seems to compare very favorably with copper coating on steel in drawing operations. Have any measurements been made of the Rockwell hardness of polished steel surfaces before and after drawing with the phosphate coating?

MR. McVEY: I personally have not made any Rockwell measurements. Of course, the polishing itself would increase the Rockwell hardness to some extent; Bonderize has no effect in this instance, except to make it easier to draw the metal.

MR. DARSEY: The phosphating has no material effect on the Rockwell hardness in this instance. We did much work on springs during the war, and we had a great deal of experience with Rockwell hardness testing and the resultant effect due to the phosphating treatment. Especially is this true where we use an oxidizing agent as a depolarizer in the bath.

MR. HOGABOOM: The adhesion of an electrodeposit depends greatly upon the Rockwell hardness of the surface of the basis metal. The adhesion of a phosphate coating may also be greatly affected if the hardness is higher than the original hardness of the metal.

MR. McVEY: The increase of Rockwell hardness in drawing is more or less due to the cold work of the steel. Claims have been made that the ductility of the steel has been increased by as much as 10-15 per cent when Bonderite is used. I don't believe that in the operation dealt with here there will be any particular difference, because the draw is not great enough to show the effect of Bonderite.

IN THE U.S. DISTRICT COURT — N.D. Ill.

[Title Omitted in Printing]

[Filed January 24, 1961]

ANSWERS OF DEFENDANT, GENERAL MOTORS CORPORATION, TO PLAINTIFFS FURTHER INTERROGATORIES DATED JANUARY 6, 1961

Defendant, General Motors Corporation, herewith answers plaintiffs' further interrogatories dated January 6, 1961, as follows:

Interrogatory No. 36

> "With respect to the bumper forming operations at the Olds Motor Works Division of defendant General Motors Corporation at Lansing, Michigan, for the period January 1, 1950 to June 1, 1950, identify the dry film lubricant or lubricants which were used therein by (a) trademark; (b) source; and (c) composition."

Defendant, General Motors Corporation, reserving all right to question and to differ from any definition of the term "dry film lubricant" which plaintiffs shall assert or contend for, answers the said interrogatory as follows:

(a) Drawing compound DQ-593;

(b) The H.A. Montgomery Company, Detroit, Michigan;

(c) Defendant has no knowledge of the composition of the lubricant in question other than information received by it from the supplier, The H.A.

Montgomery Company. This information is as follows:

Wax dispersion or emulsion containing:

9% Hydrogenated Caster Oil (Castor Wax)

9% Degras

3% Emulsifier (Soap Type)

78.41% Water

.59% Trisodium phosphate as emulsion stabilizer.

Interrogatory No. 37

"With respect to the bumper forming operations at the Olds Motor Works Division of defendant General Motors Corporation at Lansing, Michigan, for the period January 1, 1950 to June 1, 1950, were the phosphate coated steel blanks dipped in or sprayed with a rinse prior to the application of the dry film lubricant."

Answering interrogatory No. 37, defendant states that the phosphate coated steel blanks were sprayed with a hot water rinse prior to the application of the lubricant.

Interrogatory No. 38

"If the answer to interrogatory 37 above is in the affirmative, identify the rinse by (a) trademark; (b) source; and (c) composition."

Answering interrogatory No. 38, defendant states that the rinse was composed of hot, Lansing city water; (a) it was not identified by any trademark; (b) its source was the Lansing city water system; (c) city water.

Interrogatory No. 39

> "If the answer to interrogatory 37 above is in the negative, specify the treatment, if any, to which the phosphate coated blanks were subjected."

In view of defendant's answer to interrogatory No. 37 above, defendant understands that no answer is required to interrogatory No. 39.

Interrogatory No. 40

> "With respect to the bumper forming operations at the Chevrolet Spring and Bumper plant of the Chevrolet Motor Division of defendant at Livonia, Michigan, are the phosphate coated blanks dipped in or sprayed with a rinse prior to application of the dry film lubricant?"

Answering interrogatory No. 40, defendant states that the phosphate coated blanks are sprayed with a hot water rinse prior to application of the lubricant.

Interrogatory No. 41

> "If the answer to interrogatory 40 above is in the affirmative, identify the rinse used by (a) trademark; (b) source; and (c) composition."

Answering interrogatory No. 41, defendant states that (a) the rinse is not identified by any trademark; (b) the source is the Detroit city water system; (c) city water.

Interrogatory No. 42

> "If the answer to interrogatory 40 above is in the negative, specify the treatment, if any, to which the phosphate coated blanks were subjected."

In view of defendant's answer to interrogatory No. 40 above, defendant understands that no answer is required to interrogatory No. 42.

Interrogatory No. 43

> "With respect to the bumper forming operations at the Pressed Metal Plant of the Oldsmobile Division of defendant at Lansing, Michigan, are the phosphate coated blanks dipped in or sprayed with a rinse prior to application of the dry film lubricant?"

Answering interrogatory No. 43, defendant states that the phosphate coated blanks are sprayed with a hot water rinse prior to application of the lubricant.

Interrogatory No. 44

> "If the answer to interrogatory 43 above is in the affirmative, identify the compounds used by (a) trademark; (b) source; and (c) composition."

Answering interrogatory No. 44, defendant states that the rinse material used is hot water; (a) it is not indentified by any trademark; (b) the source is the Lansing city water system; (c) city water.

Interrogatory No. 45

> "If the answer to interrogatory 43 above is in the negative, specify the treatment, if any, to which the phosphate coated blanks are subjected."

In view of defendant's answer to interrogatory No. 43 above, defendant understands that no answer is required to interrogatory No. 45.

GENERAL MOTORS CORPORATION

By /s/ Charles A. Chayne
its Vice President

[Jurat and Certificate of Service Omitted in Printing]

IN THE U.S. DISTRICT COURT — N.D. ILL. [VALIDITY TRIAL TESTIMONY]

Friedberg — Cross

* * *

[248]* Q. Now, is the presence of any one of these indicated compounds such as boron phosphate essential to satisfactory drawing of a ferrous metal?

A. Yes, in my opinion it is.

Q. Which ones are essential, all of the boron type of compounds?

A. The boron phosphates that are formed — and I wouldn't know whether all of the boron phosphate compounds are formed or could be formed, but some of them are formed, and that is an aid in the [249] forming of the metal. I could not tell you whether all of the possibilities of boron phosphate compounds that could be formed are formed in this process.

Q. Well, is it your position that without the boron compounds but merely with soap over a phosphate coating you could not successfully draw a ferrous metal rod or wire?

A. That is not my opinion.

[250] Q. What is your opinion?

A. Soap over phosphate has been drawn.

Q. Without borax?

A. It has been done without borax, yes.

Q. And you have done it on one of your tests here?

A. Correct.

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* Validity trial transcript page.

Q. But it is your opinion that the addition of the borax increases the ease of the drawing operation, using soap and a phosphate coating?

A. Yes.

Q. And it is your opinion, I take it, that some boron compounds, whatever it may be, is responsible for that added facility of drawing?

A. Well, it is a known fact that glassy compounds are an aid in drawing, therefore, if you form a glassy compound surface you are going to have better drawing properties.

Q. Well, you volunteered that a glassy compound is an aid to drawing. You are familiar, are you not, with the fact that glasses as such have been used for coating wire prior to drawing, to aid in the drawing operation?

[251] A. I have heard that.

Q. And you are familiar with the fact that glasses quite frequently include a borate or a boron oxide?

A. I am not familiar with the particular composition of these glasses.

Q. Now, did I understand you to testify that no zinc stearate at all was shown by the X-ray in Chart No. 25?

A. No. I specifically stated that we did not say that there is no zinc stearate at all, but if it is there it is there in smaller amounts than on those samples where the borax is absent.

Q. And by "smaller" what do you mean percentagewise?

A. I could not give you any percentages since I did not make any measurements. I could only say that to give a relative order I would say that one is there in trace quantities and the other one is there in larger quantities.

• • •

IN THE U.S. DISTRICT COURT — N.D. ILL. [VALIDITY TRIAL TESTIMONY]

Lenz — Cross

* * *

[294]* Q Had you ever tried to use as a die lubricant without a phosphate coating a soap that you know of?

A Are you asking me whether we put soap on their parts?

Q Yes.

A No, sir, we did not.

Q Never tried that?

A No, sir.

Q And you have not either tried just soap [295]* alone over phosphate coating?

A No, sir.

* * *

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* Validity Trial Transcript Page. Also found on Accounting Trial Transcript Page No. 1712.

IN THE UNITED STATES COURT OF APPEALS
FOR THE SEVENTH CIRCUIT
NO. 13979
[TITLE OMITTED IN PRINTING]
[FILED JANUARY 22, 1963]
BRIEF FOR PLAINTIFF-APPELLANT

* * *

[7] Summary Statement of the Henricks' Invention.

Such briefly was the state of the art when Henricks made his invention. A number of variants of the above-described lubricating schemes had been proposed, as reflected in the thirty-one references relied upon by defendants but none of them differed in principle from what has been described above.

Plaintiffs readily concede that all of the elements which he employed were old per se or in other combinations and had been available in the art for many years. What Henricks did was to select his elements out of these old combinations and put the selected ones together in a new way, to achieve a new result.

The new combination of the Henricks' invention is defined in claim 4 as follows:

> "The process of working ferrous metal which comprises
>
> (i) forming on the surface of the metal a phosphate coating and
>
> (ii) superimposing thereon a fixed film of a composition comprising
>
> [8] (a) a solid meltable organic binding material containing distributed therethrough

(b) a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and

(iii) thereafter deforming the metal."

In the specific embodiment of claim 4 with which we are here concerned, the "phosphate coating" (i) is the abrasive coating of the Singer process — a seeming retrogression in the art. The overlying film (ii) is a *fixed* one and the "solid meltable organic" constituent thereof (ii-a) is *soap*, the use of which had previously been found undesirable because of the cleaning problem. The "solid meltable *inorganic compound*" distributed therethrough, meltable at a temperature below the melting point of the abrasive phosphate coating and having a hardness not more than 5 on the Mohs' scale (ii-b) is *borax*.

New and unexpected results flow from the conjunction of elements defined in the drawing process of the Henricks patent. Tool and die life is greatly increased and severe forming and drawing operations can now be performed which were previously impossible. Specifically, there is a coaction during the high temperatures and pressures of the drawing process whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating (App. 37). The formation of insoluble organic materials is inhibited and there is no cleaning problem (App. 34, 35).

The new coaction between the soap, borax and phosphate prior to and during the actual drawing step was illustrated and established by Henry F. Friedberg, a qualified [9] scientist, whose evidence is uncontradicted. Friedberg subjected a series of specimens of selectively treated lengths of the same wire rod to a high temperature and high pressure drawing operation and then ran X-ray diffraction analyses on the specimens, both before and after the drawing operation, to show qualitatively the changes which occurred. The specimens comprised one provided with a phosphate coating alone (Pltfs' Ex. 10), one provided with a phosphate coating and a dried-on soap coating (Pltfs' Ex. 11), one provided with a phosphate coating and a borax coating without soap (Pltfs' Ex. 12), and one provided with a phosphate coating and a dried-on soap and borax coating (Pltfs' Ex. 13). Friedberg's tests showed that in the Henricks invention new compounds are formed, the formation of insoluble organic compounds is inhibited and the abrasive phosphate is transformed during the drawing operation into a glassy amorphous compound having highly effective lubricating properties (App. 33-38). Friedberg's X-ray diffraction analysis and tests confirmed that the combined use in the Henricks invention of the old soap, borax and phosphate elements, which were taken from the prior art, brought about a new coaction and new results with even greater efficiency than they separately or in other combinations provided (Decision App. 139).

There is consonant evidence based on commercial use. B.W. Lenz of Metal Forming & Coining Corporation of Toledo, Ohio testified at trial as to the experience of his company. Metal Forming tried a number of prior art schemes including oils, waxes and drawing compounds (App. 39), but the only scheme that enabled them to coldform or coin small parts commercially is the combination of the Henricks invention (App. 41). Tool and die life was increased a thousand fold, so that for given tools, three or four hundred thousand pieces were run where previously [10] only three or four hundred pieces could be run (App. 39, R. 280-281).

Metal Forming tried the prior art lubricating schemes both over phosphate and alone (App. 39, 41). Until the soap and borax over phosphate combination of the Henricks' invention was adopted, they had unsatisfactory (rough) surfaces, could not hold dimensions and had very short tool life (App. 39, 41 and 42).

The invention has made it possible to manufacture articles of superior quality and at lower cost, the advantages being so marked in some cases as to spell the difference between success and failure on many heavy reductions and difficult extrusions. Parker Rustproof's former technical director readily admitted this fact (App. 57); and it appeared in a technical publication of Parker (Pltfs' Ex. 38) which says:

> "These dry Bonderlube lubricants are amazingly efficient and have made the difference between success and failure on many heavy reductions and difficult extrusions. These excellent lubricants deliver other advantages in operation. They are dry. They are clean, ending the mess caused by grease or oil on work and tools * * *."

There is no contrary evidence whatsoever.

* * *

[30] III. The Combination of the Henricks Invention Achieves Significant New Results and Meets the Test of A. & P. v. Supermarket.

The Trial Court in effect recognized that the combination of the Henricks' invention met the test of *A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S. 147 (1950) when it said:

> "Both phosphate coating and the use of borax or its equivalent and the use of soap were individually known in the drawing of metals. Their combined use is indicated to give even greater efficiency and ease in performing the same drawing operations they were theretofore used separately to perform (and in the prior public uses, used conjointly to perform)" (App. 139).

The undisputed evidence of Friedberg and Lenz amply justifies this conclusion. Their evidence shows that only in the combination of the Henricks' invention is the abrasive phosphate transformed into a glassy, lubricating material and the formation of insoluble organic compounds inhibited and that this combination has no equal. (App. 34-38.)

Defendants and their powerful allies and associates would not be defending this action unless they felt that the Henricks invention represented something of special value and merit which they feel compelled to use. Parker has paid it the highest tribute and claimed it for its own.

The novelty of the combination of the Henricks invention and the new and surprising result thereby achieved seem to be agreed facts and the only real question is who did it first.

* * *

[38] It is elemental that patent claims must be generic in character and do not have to be specific, or else they could be easily avoided. *Lever Bros. Co. v. Procter & Gamble Mfg. Co.*, 139 F. 2d 633, 639 (4th Cir., 1943). Certainly, for example, it is no vice that the claim calls for "a phosphate coating" without specifying which phosphate coating. There are several types of phosphate coatings and a generic description is required if multiplicity of claims is to be avoided and the patentee afforded the protection to which he is entitled.

Likewise, this Court recently recognized that there is no requirement that quantitative values be set forth in a claim and that the fact that experimentation or the exercise of judgment is necessary to adapt a patented process to a particular material does not impair validity, *Binks v. Ransburg, supra*, and proposition of law VI.

These defendants deliberately choose to utilize borax, an inorganic compound, in their process and thereby obtain the benefits of the present invention. Defendants are skilled in the art and know what they are doing. It is immaterial whether the claim contains a numerical limitation to a specific amount of borax. If defendants want to avoid infringement, all they need to do is leave out the borax.

* * *

IN THE U.S. DISTRICT COURT — N.D. ILL.
[TITLE OMITTED IN PRINTING]

[FILED APRIL 21, 1965]

PLAINTIFFS' MOTION TO TRANSFER AS TO DEFENDANT GENERAL MOTORS CORP. TO THE DISTRICT COURT FOR THE DISTRICT OF DELAWARE

Plaintiffs move that this action as to the defendant, General Motors Corporation, be transferred to the District Court of the United States for the District of Delaware.

(1) This Motion is brought pursuant to the provisions of 28 U.S.C. 1406(a):

> §1406. Cure or waiver of defects
>
> "(a) The district court of a district in which is filed a case laying venue in the wrong division or district shall dismiss, or if it be in the interest of justice, transfer such case to any district or division in which it could have been brought."

(2) Defendant, General Motors Corporation, is a Delaware corporation.

(3) Proper jurisdiction and venue may be had in the District of Delaware by virtue of the provisions of 28 U.S.C 1400(b):

> §1400. Patents and copyrights
>
> "(b) Any civil action for patent infringement may be brought in the judicial district where the defendant resides, * * *."

(4) The Motion is brought in view of General Motors Corporation's persisting in its position that venue is improper as to it in the Northern District of Illinois because the accused

practice has not been used in this District, even though the accused practice admittedly has been used in other Districts.

(5) The Motion is brought to remove any question of proper venue and thereby save the Court, as well as the parties, the considerable time and expense necessary to resolve the venue issue, which transfer to the District of Delaware would obviate.

WHEREFORE, plaintiffs submit that the District of Delaware is a proper forum for this action and that a transfer of this action to the District of Delaware is in the interest of justice under 28 U.S.C. 1406(a).

Respectfully submitted,

By /s/ Frank H. Marks

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[Certificate of Service Omitted in Printing]

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ILLINOIS

[DEPOSITION OF L.C. BORCHERT TAKEN MAY 19, 1965 IN DEVEX V. HOUDAILLE CASE, CIVIL ACTION 57 C 892, U.S. DISTRICT COURT, N.D. ILL. AND INTRODUCED BY DEFENDANT IN THE ACCOUNTING TRIAL BY READING INTO THE RECORD]

[4292]* MR. FROST: Starting on page 3:

"Q. Would you state for the record your name, age, and residence?

"A. Leslie C. Borchert, age 58. And what else?

"Q. Your residence.

"A. Right now it's Huntington, West Virginia.

"Q. Are you the same Leslie C. Borchert who has subscribed to two affidavits on behalf of defendant Houdaille Industries —

"A. Yes; yes, sir."

Now I am over on page 4 at the top of the page.

"Q. Well, if you would, just locate the first one for the present, Mr. Borchert.

"A. All right.

"Q. That is the one I am going to examine you on initially. I notice from your affidavit that you graduated from the University of Michigan.

"A. Right.

---

* Accounting trial transcript page

"Q. In 1958?

"A. Right.

"Q. And apparently it appears that you [4243] have worked for Houdaille ever since.

"A. That's right.

"Q. In various capacities?

"A. In various divisions.

"Q. But you have never worked for any other company?

"A. No.

"Q. Do you consider yourself, putting modesty aside, Mr. Borchert, an expert, or do you hold yourself out as an expert in the electroplating of bumpers?

"A. I would say a practical expert, yes.

"Q. How about the drawing of the bumpers; do you consider yourself an expert in that?

"A. No, I do not, to the extent that we have — we did have charge of the solution part of the operation, but we do not concern ourselves with the dies or the actual drawing operations.

"Q. How about the lubricants used in drawing the bumpers?

"A. We control them and provide a suitable lubricant for the press operations.

"Q. Now, by the term "we," do you mean [4244] as an electroplater you have something to say about that, or what do you mean?

"A. By 'we' I mean the Chemical and Engineering Department of the corporation.

"Q. Now, speaking for yourself, do you consider yourself an expert on the lubricants that are to be used in drawing bumpers?

"A. Only to the extent that we obtained the best lubricants possible for the job at hand.

"Q. Do you mean from the electroplating point of view or do you mean —

"A. Both from the electroplating point of view and the operaton of the press shop."

Now I am turning to page 11.

"Q. Referring again to your second affidavit you, on page 2, in paragraph 2, recite the use of a lubricant of soap with no borax, 'hereinafter termed "a soap only" lubricant.'

"A. Yes.

And now, Mr. Stargatt, I would just like to turn briefly to the affidavit which is at the tab at the end of Defendant's Exhibit A-11 and I call attention to paragraph (3) of that affidavit which reads as follows.

> [4245] "That the respective processes using the soap-borax and the soap-only lubricants have been equally satisfactory from a commercial standpoint and have shown no noticeable differences in the length of useful life of dies used therein or in the type of the cleaning steps required for the removal of residual coatings or deposits from the surface of the formed workpiece to render such surface properly receptive of an electroplated metal coating of commercially acceptable quality."

Now going back to page 11 and continuing.

"What do you mean by the 'soap only' lubricant?

"A. Just as it states, that the lubricant is composed of soap only.

"Q. Was there anything else put into it to take the place of the borax?

"A. No.

"Q. Does Houdaille regularly analyze the water that they use in their lines?

"A. The water used in this particular line is put through water softeners.

"Q. Could you expand on that a little? [4246] What treatment do you give the water?

"A. Zeolite water softener treatment.

"Q. Since you have been with Houdaille since 1928, I gather that you are familiar with the transition of the electroplating at that plant —

"A. Right.

"Q. — and the preparation of bumpers.

"A. Yes.

"Q. And were even prior to this, prior to the time that they adopted the practice complained of?

"A. That's right.

"Q. Now, let's see. According to your affidavit, subsequent to the decision in this case finding validity of the Henricks patent, on or about July 12, 1963, Houdaille went to the soap-only lubricating procedure?

"A. Right.

"Q. And prior to that they used soap and borax?

"A. That's right."

Now I turn to page 50, which is about the fifth page from the back of the selections we have here.

[4247] "Q. Is it your present position that the Huntington Division plant is using soap alone over phosphate?

"A. Yes.

"Q. The question was asked you previously about the water and you said it was Zeolite-treated.

"A. Yes.

"Q. What was the hardness of the water after Zeolite treatment?

"A. Zero, or at the most about one part per million.

"Q. With regard to the cleaning operations preparatory to electroplating the bumper bars at your Huntington division plant, what were your cleaning operations when using soap-borax over bare metal?

"A. Two cathodic electrolytic cleaners, water rinse, and anodic etch.

"Q. And after the changeover to soap-borax over phosphate, what were your cleaning operations?

"A. The same.

"Q. And after the changeover from soap- [4248] borax to soap-alone over phosphate?

"A. Yes?

"Q. What were your cleaning operations then?

"A. There was no change.

"Q. From your experience in the cleaning and electroplating art, were there any ways in which you knew of simplifying the cleaning operations as between those two stages where you were using soap-borax over phosphate and soap-alone over phosphate?

"A. Not in our cleaning line, no.

"Q. Did you get any better or worse results using soap-alone over phosphate than with soap-borax over phosphate?

"A. No, there had been no change in appearance or rejections when we changed over from one to the other.

"Q. Now, except for the matter of the electroplating, the metal surface of the bumper bar would be considered clean after your electrolytic steps, would it not?

"A. Enameling and plating would be the only two processes that I would know of that it [4249] would cause difficulty in.

"Q. Now, did the use of soap-alone over phosphate make the cleaning steps any more difficult or less difficult than the soap-borax over phosphate?

"A. We haven't found it so, no."

That completes the selections we had from this deposition.

I might say as a matter of information, Mr. Borchert has been ill, so we are using the deposition.

* * *

IN THE U.S. DISTRICT COURT
FOR THE DISTRICT OF DELAWARE
[TITLE OMITTED IN PRINTING]

[FILED JULY 17, 1968]
AMENDED COMPLAINT

1. This is a civil action for patent infringement. The jurisdiction of the Court in this action arises under the Patent Laws of the United States.

2. The plaintiffs herein are:

DEVEX CORPORATION (herein called "DEVEX"), an Ohio corporation having its principal place of business at 1296 Hall Avenue, Lakewood 7, Ohio.

TECHNOGRAPH, INC. (herein called "TECHNOGRAPH"), a North Carolina corporation having its principal place of business at 920 Northwest Boulevard, Winston-Salem, North Carolina.

WILLIAM C. McCOY (herein called "McCOY"), a citizen of the state of Ohio residing at 2712 Claythorne Road, Shaker Heights, Ohio.

THEODORE A. TeGROTENHUIS (herein called "TEGROTENHUIS"), a citizen of the state of Ohio residing at 7315 Columbia Road, Olmsted Falls, Ohio.

FREDERICK B. ZIESENHEIM, a citizen of the Commonwealth of Pennsylvania residing at 355 Woodside Road, Pittsburgh, Pennsylvania 15221.

MARJORIE E. TeGROTENHUIS, a citizen of the state of Ohio residing at 7315 Columbia Road, Olmsted Falls, Ohio.

WILLIAM C. McCOY, JR., a citizen of the state of Ohio residing at Shaker Boulevard, R.D. #3, Chagrin Falls, Ohio.

KATHARINE M. BASSETT, a citizen of the state of Connecticut residing at 27 Ox Ridge Lane, Darien, Connecticut.

3. The Defendant General Motors Corporation is a corporation organized and existing under the laws of the State of Delaware, and it is domesticated in Illinois and qualified as a foreign corporation to do business in the State of Illinois. This Defendant has several regular and established places of business in Illinois, including regular and established places of business in the City of Chicago and within the Northern District of the State of Illinois; and this Defendant has committed acts of infringement herein complained of in the Northern District of Illinois as well as elsewhere in the United States.

4. The action was brought by McCOY and TeGROTENHUIS the then owners of Patent Re. 24,017 and by DEVEX because of its reversionary rights. Since that time there have been several transfers of ownership to Patent Re. 24,017, but plaintiff TECHNOGRAPH has acquired and now holds all rights in and to Patent Re. 24,017 save bare legal title, subject only to defendant DEVEX's reversionary rights. TECHNOGRAPH has the exclusive right to license Patent Re. 24,017 and the exclusive right to settle for all infringements of Patent Re. 24,017. Plaintiffs, WILLIAM C. McCOY, THEODORE A. TEGROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE E. TEGROTENHUIS, WILLIAM C. McCOY, Jr. and KATHARINE M. BASSETT are nominal parties to this action holding between them undivided bare legal title to Patent Re. 24,017. Plaintiff DEVEX remains a party to this action by virtue of its reversionary rights. The respective interests of the plaintiffs are evidenced by documents recorded in the Patent Office at the following places: Reel 104, Frames 423, 424 and 425; Reel 1397, Frames 310 and 311; Reel 1495, Frames

333 and 335; and Reel 1828, Frames 085, 086, 087, 088, 089, 090, and 091.

5. Patent Re. 24,017 was issued to John A. Henricks of Lakewood, Ohio on June 7, 1955, covering an invention for a "Method of Coating and Drawing Metal and Compositions Thereof". A copy of Patent Re. 24,017 (hereinafter called the "Henricks patent") is attached to the Amended Complaint as Exhibit A. The invention was originally lawfully patented in the United States on March 4, 1952, as Patent No. 2,588,234, which patent was lawfully reissued on June 7, 1955, as Patent Re. 24,017.

6. The defendant, General Motors Corporation, has infringed and is continuing to infringe Claim 4 of the Letters Patent Reissue No. 24,017 by drawing and deforming metal by processes which involve the use of soap and borax over phosphate. In addition, by substituting different chemical ingredients for borax, General Motors has obtained the same coaction to produce the same new and unexpected results which are effected by soap and borax over phosphate as disclosed by the specifications of Examples XIX and XX of said Reissue Patent as set forth in the Memorandum Opinion of this Court dated May 23, 1968. Defendant General Motors Corporation has been fully informed with regard to said patent and its infringement thereof, but has nevertheless continued to infringe the same.

PRAYERS ON THE AMENDED COMPLAINT

WHEREFORE, plaintiffs pray:

a. That defendant GENERAL MOTORS and those acting under and for it be enjoined from further infringement of claim 4 of the patent in suit, 35 U.S.C. § 283;

b. That plaintiffs be awarded damages adequate to compensate for the infringement, but in no event less than a reasonable royalty, together with interest, costs and reasonable attorneys' fees, 35 U.S.C. §§ 284 and 285; and

c. That plaintiffs be awarded such other and further relief as the Court may deem fair and just.

DEVEX CORPORATION
TECHNOGRAPH, INC.
WILLIAM C. McCOY
THEODORE A. TeGROTENHUIS
FREDERICK B. ZIESENHEIM
MARJORIE E. TeGROTENHUIS
WILLIAM C. McCOY, JR.,
KATHARINE M. BASSETT

Date:

By s/ David F. Anderson

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Potter, Anderson & Corroon
350 Delaware Trust Building
Wilmington, Delaware 19801
Attorneys for Plaintiffs

* * *

IN THE U.S. DISTRICT COURT FOR THE DISTRICT OF DELAWARE

[TITLE OMITTED IN PRINTING]

[FILED AUGUST 19, 1968]

DEFENDANT'S ANSWER TO AMENDED COMPLAINT

Now comes defendant, General Motors Corporation, and for its answer to the Amended Complaint in the above entitled cause states:

1. Answering Paragraph 1 of the Amended Complaint, defendant admits that this is a civil action for patent infringement and that the jurisdiction of the United States District Court of the District of Delaware arises under the Patent Laws of the United States but denies that the United States District Court for the Northern District of Illinois where the action was originally brought had jurisdiction of defendant with respect to the cause of action alleged in the original Complaint or in the Amended Complaint.

2. Answering Paragraph 2 of the Amended Complaint, defendant is without knowledge or information sufficient to form a belief as to the truth of the allegations therein set forth and leaves plaintiffs to their proofs thereof.

[2] 3. Answering Paragraph 3 of the Amended Complaint, defendant admits that it is a corporation organized and existing under the laws of the State of Delaware, and that it is qualified and licensed as a foreign corporation to do business in the State of Illinois, and that it has regular and established places of business in the State of Illinois and in the City of Chicago and within the Northern District of Illinois. Defendant denies that it has committed the acts of infringement alleged in said Amended Complaint in the State of Illinois, or in the Northern District thereof, or elsewhere in the United States.

4. Answering Paragraph 4 of the Amended Complaint, defendant is without knowledge or information sufficient to form a belief as to the truth of the allegations therein set forth and leaves plaintiffs to their proofs thereof.

5. Answering Paragraph 5 of the Amended Complaint, defendant admits that on June 7, 1955 Patent No. Re. 24,017 was issued to John A. Henricks of Lakewood, Ohio, for an alleged invention for a "Method of Coating and Drawing Metal and Composition Therefor" but denies that the same was lawfully issued, and further admits that Patent No. Re. 24,017 was originally issued as Patent No. 2,588,234 on March 4, 1952 but denies that said original Patent No. 2,588,234 was lawfully issued or that any alleged invention was lawfully patented therein.

6. Answering Paragraph 6 of the Amended Complaint, defendant denies each and every allegation therein set forth.

7. Defendant further answering said Amended Complaint avers that on the date the Complaint was originally filed in the United States District Court for the Northern District of Illinois it was a resident of the state of Delaware and was not a resident of the judicial district in which the suit was brought [3] and that it had not committed any act of infringement alleged in said Complaint within the State of Illinois or within the Northern District of the State of Illinois, and avers, therefore, that venue of the action with respect to defendant, General Motors Corporation, in the Northern District of Illinois was improper under Section 1400(b) of the United States Code, Title 28, and that the United States District Court for the Northern District of Illinois was therefore without jurisdiction of defendant to hear and determine the cause of action alleged in the said Complaint or any issues in connection therewith, including the issue of validity of Claim 4 of said Patent No. 24,017, or to grant the relief demanded in said Complaint against defendant General Motors Corpora-

tion. Defendant further avers that by motion and in its Answer to the original Complaint it properly and timely raised the defense of improper venue and lack of jurisdiction of the person of defendant of the United States District Court for the Northern District of Illinois with respect to the cause of action alleged in said original Complaint and that at all times thereafter it preserved and did not waive its defense of said improper venue and lack of jurisdiction and, as a consequence, the holding of validity of Claim 4 of Patent No. Re. 24,017 in suit by the Court of Appeals of the Seventh Ciruit is not binding upon defendant General Motors Corporation and the validity of Claim 4 of said patent is an issue for determination by the United States District Court for the District of Delaware.

8. Further answering said Amended Complaint, defendant avers that:

(a) None of the processes used by it infringe or have infringed any of the claims of said Patent No. Re. 24,017, including Claim 4 thereof, and that the claims of said patent [4] and particularly Claim 4 thereof are so limited in terms and in light of the prior art and by virtue of limitations and interpretations necessarily placed upon them during the prosecution of the applications therefor in the Patent Office and during the proceedings and on the appeal on the issue of validity of Claim 4 of said patent in the United States District Court for the Northern District of Illinois and in the Court of Appeals for the Seventh Circuit, as shown by the said Court of Appeals' decisions in *Devex Corporation et al* v. *General Motors Corporation et al*, 321 F.2d 234 (C.A. 7, 1963) and in *Devex Corporation et al* v. *Houdaille Industries*, 382 F.2d 17 (C.A. 7, 1967), as to render the claims, including Claim 4, of said patent ineffective in scope to cover any of defendant's processes, and plaintiff is estopped by the proceedings in the Patent Office in connection with the prosecution of the applications for said patent and by the prior court proceedings between the parties to assert that any of defendant's processes constitute an infringement of any of said claims and particularly Claim 4 of said patent.

(b) With respect to the use of a soap-borax lubricant over phosphate on a ferrous metal surface which is deformed, Claim 4 of the Henricks Reissue Patent No. 24,017, in suit, as restricted and interpreted by the Court of Appeals of the Seventh Circuit in sustaining the validity of said claim, is not supported by the disclosure of nor entitled to the filing date of the original, abandoned Henricks application, Serial No. 665,905 filed April 26, 1946, of which the later Henricks application Serial No. 193,290 filed October 31, 1950 is a continuation in part. Original patent No. 2,588,234 granted March 4, 1952 and reissued to patent No. 24,017 in suit, was issued on the 1950 application Serial No. 193,290. The original 1946 application Serial No 665,905 contained no disclosure of a process of coating and drawing metal [4a] comprising the use of a soap-borax lubricant applied over a phosphate coating nor any disclosure of any of the alleged new and unexpected results or the alleged new coaction upon which the Court of Appeals of the Seventh Circuit sustained validity of Claim 4.

The patentee Henricks first disclosed in the United States Patent Office the use of a soap-borax lubricant applied over a phosphate coating in a metal forming process in the specification of his continuation-in-part application Serial No. 193,290 filed October 31, 1950, particularly in Examples XIX and XX thereof. The new matter added in the 1950 continuation-in-part application by Henricks included the disclosure of a soap-borax-over-phosphate process. None of the description and none of the examples set forth in Henricks' 1946 application disclosed or comprised a soap and borax lubricant nor disclosed the use of such a soap and borax lubricant over a phosphate coating.

That Henricks' disclosure of a method of coating and forming metal using a soap-borax lubricant over a phosphate coating was made for the first time in his later 1950 continuation-in-part application Serial No. 193,290 is established by Henricks' Canadian application filed October 29, 1951 in the Canadian Patent Office and containing specifications, including soap-borax over phosphate Examples XIX and XX, and claims, including Claim 4 in suit, identical with the Henricks 1950 United States application. Canadian Patent No. 513,854 issued on said application on June 21, 1955. In the petition to said 1951 Canadian application Henricks stated that he was entitled to the October 31, 1950 United States filing date under the Treaty or Convention rights of Applicant as it relates to all claims because the United States 1950 application was the first application for patent for said invention filed in any country by him or anyone claiming under him. [5] Thus, Henricks represented to the Canadian Patent Office that his 1950 United States application disclosed for the first time the soap-borax-over-phosphate process and he is estopped by such representations to maintain that his said 1946 United States application contained any disclosure thereof.

9. Further answering said Amended Complaint, defendant avers that the aforesaid Reissue Patent No. 24,017 and all claims thereof, including Claim 4, are invalid and void on the following grounds:

(a) That the applicant for said patent was not the original, first and sole inventor of the invention purported to be described and claimed in the said patent and that the said alleged invention was in all material and substantial respects and parts invented, known and used by others in this country, or patented and described in printed publications in this and foreign countries, before the invention thereof by the applicant for said patent;

(b) That the alleged invention purported to be described and claimed in said patent, in all material and substantial respects and parts was patented or described in printed publications in this or in foreign countries, or was in public use or on sale in this country, more than one year prior to the date of the application for the said patent in the United States;

(c) That the invention purported to be described and claimed in said patent was in all material and substantial respects and parts described in patents granted on applications for patent by others filed in the United States before the invention thereof by the applicant for said patent;

(d) That the applicant for said patent did not himself invent the subject matter sought to be patented in said Letters Patent;

[5a] (e) That before the alleged invention by the applicant for said Letters Patent of the subject matter described and claimed in said Letters Patent, the alleged invention thereof in all its material and substantial respects and parts was made in this country by others who had not abandoned, suppressed or concealed it;

(f) That the differences between the subject matter sought to be patented in said Letters Patent, and the prior art are such that the subject matter of said Letters Patent as a whole would have been obvious at the time the alleged invention was made to a person having ordinary skill in the art to which the said subject matter pertains;

(g) That said Letters Patent are invalid and void for failure to comply with Section 112 United States Code Title 35 in that the Claims thereof fail to particularly point out and distinctly claim the subject matter which applicant regards as his invention in such matter as to clearly distinguish the same from the prior art;

(h) That said Letters Patent Reissue No. 24,017 are void on the ground that the alleged error in the original patent did not arise through error without any deceptive intention, and on the ground that the same are not for the same invention as the original patent.

10. The following prior art patents and publications and instances of prior public knowledge, prior public use and sale and prior invention will be relied upon by defendant in support of its defenses set forth in Paragraphs 9(a) to 9(g), inclusive, hereof:

[6]

UNITED STATES PATENTS

Number	Name	Date
1,769,577	Hopkins	July 1, 1930
1,982,065	Orozco	November 27, 1934
2,105,015	Singer	January 11, 1938
2,116,954	Singer	May 10, 1938
2,258,309	Zimmer	October 7, 1941
2,469,473	Orozco and Henricks and application therefor filed August 2, 1943	May 10, 1949
2,470,062	Whitbeck and application therefor filed October 8, 1948 and also abandoned application referred to therein being Ser. No. 625.113 filed October 27, 1945	May 10, 1949

Number	Name	Date
2,530,837	Orozco and Henricks and application therefor, Ser. No. 41,902 filed July 31, 1948, and also original application therefor, Ser. No. 497,117 filed August 2, 1943.	November 21, 1950

FOREIGN PATENTS

British No. 367,198	1932
British No. 11,439	1912
British No. 496,866	1938
British No. 494,830	1938

[7] PRIOR PUBLICATIONS

Transactions of American Society for Steel Treating, Vol XXI, January 1933 — December, 1933, title page and pages 181-192, incl.

October 1931 issue of Wire & Wire Products, title page and pages 393-395, 414, 415.

Korrosion Und Metallschutz, Vol 17, No. 6, pages 211-214, June, 1941.

Metallwirtschaft, Vol 21, pages 7-14, published 1942.

Stahl Und Eisen, Vol. 62, title page and pages 968-973, published 1942.

American Machinist, May 13, 1943, title page and pages 121-128, incl.

PRIOR PUBLIC KNOWLEDGE, PRIOR PUBLIC USE AND ON SALE, AND PRIOR INVENTION

Briggs Manufacturing Company, Detroit, Michigan, steel cartridge case operations at plant at Eight Mile Road and Mount Elliott, Detroit, Michigan, during year 1943.

Frank M. Tousley, 264 Hamilton Court, Grosse Pointe Farms, Michigan, and Harold F. Brown, 23401 Seneca, Oak Park, Michigan, Briggs employees having knowledge of the above operations at the Briggs Manufacturing Company.

Northern Engraving & Manufacturing Company of LaCrosse, Wisconsin.

Wayne G. Dickinson, 157 North Michigan Street, Prairie du Chien, Wisconsin, and Lew Scott, 1424 Collins Road, Fort Myers, Florida, had knowledge of the prior use and sale by Northern Engraving & Manufacturing Company of LaCrosse, Wisconsin.

[8] Rockwell-Standard Corporation, Pittsburgh, Pennsylvania, bumper forming operations at its plants in Coraopolis, Pennsylvania and Newton Falls, Ohio, as early as the summer of 1948.

Mr. Gerard M. Hurley, 319 Superior Street, Newton Falls, Ohio; Mr. Glade Bowman, 522 Genesee Avenue, Warren, Ohio; Mr. Adloph A. DePrisco, 1401 S. Roosevelt, Columbus, Ohio; Mr. Alex R. McCutcheon, Coraopolis, Pennsylvania, Mr. Eugene Anderson, Mishawaka, Indiana, and Harold McVey, 1307 W. Lake Drive, Wald Lake, Michigan, having knowledge of the above operation at the Coraopolis, Pennsylvania, and Newton Falls, Ohio plants of Rockwell-Standard Corporation's Standard Steel Spring Division.

Houdaille Industries, Inc., Buffalo, New York, bumper forming operations at plant in Huntington, W. Virginia, as early as April 25, 1949.

Leslie C. Borchert, Huntington, W. Virginia, an employee having knowledge of the above operations at the said plant.

The names and addresses of additional persons who may be relied upon as prior inventors, or as having prior knowledge of the alleged invention of said Letters Patent Reissue No. 24,017, are the patentees of and/or applicants for the above-cited United States Letters Patent, and their addresses so far as presently known to Defendant, are the addresses given in the said patents.

WHEREFORE, plaintiffs are not entitled to any of the relief prayed for in the Amended Complaint and in the original Complaint, and defendant is entitled to a judgment adjudging and decreeing that defendant has not infringed said Reissue Patent No. 24,017, particularly Claim 4 thereof, that said patent and particularly Claim 4 thereof are invalid and void, that the Amended Complaint herein be dismissed for want of a cause of action against this defendant, and that defendant be awarded [9] its costs and expenses and its reasonable attorneys' fees in this action.

GENERAL MOTORS CORPORATION

By /s/ Thomas S. Lodge

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Wilmington, Delaware 19899
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Hibben, Noyes & Bicknell
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Chicago, Illinois 60604

* * *

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, ET AL,
Plaintiffs,

v.

GENERAL MOTORS CORPORATION,
Defendant.

CIVIL ACTION
No. 3545

DEFENDANT'S MEMORANDUM IN OPPOSITION TO PLAINTIFFS' MOTION FOR CONSOLIDATION

[Sept. 12, 1968]

* * *

[6] Only two accused processes are involved in 3058 for this Court's determination of the infringement issues. Manifestly, it is quite conceivable that plaintiffs, in a further attempt to broaden the interpretation of Claim 4 as they recently tried in connection with the Amended Complaint in 3058 and as the language of the Amended Complaint in 3545 clearly shows, will seek to involve a great many more additional processes of defendant during the 1962-1968 period covered by 3545. On these additional processes of defendant, plaintiffs will have to start their belated discovery from scratch and such discovery will consume months and months, if not years, this time estimate being conservative in view of the length of time plaintiffs have consumed for discovery on only the two 3058 processes of the 1952-1956 period.

To consolidate 3545 with 3058 and thus delay trial of the 3058 infringement issues could only result in serious prejudice to defendant. We remind the court that the two accused processes in 3058 occurred twelve or more years ago and that a further delay for as much as two years would work to the disadvantage of defendant. While witnesses are presently [7] available to furnish pertinent and direct testimony and evidence to this Court, there is no guarantee that they will be so available two years hence. Moreover, the longer the delay the more difficult will be defendant's proofs. Loss of witnesses and their testimony at this trial would seriously prejudice defendant, particularly since these witnesses are now in a position to give their testimony in the relatively near future.

We further point out that at the trial of 3058 evidence will be introduced on behalf of defendant on the prior soap-borax-over-phosphate processes of Standard Steel Spring and Houdaille Industries showing the state of the prior art and having pertinency as to the scope of Claim 4. Proofs of these prior processes going back to the 1946-48 era of more than twenty years ago is now available by live witnesses; but here again defendant has no guarantee that such witnesses will be alive, in good health and available two years hence. Consolidation should not be effected and thus cause a delay by which defendant may be seriously prejudiced.

Furthermore, it is an entirely false argument that time will be saved by consolidation. The same amount of time would be consumed whether two infringement issues are tried now and the other issues tried later or whether they are tried consecutively at one long trial. Moreover, if plaintiffs succeed in an early trial in 3058 and one or both of the two accused 1952-1956 processes are deemed to be an infringement of Claim 4, [8] then all the other accused processes of defendant from 1956 to the present date will be involved on the accounting, including those processes in 3545 which plaintiffs seek to consolidate. In such an event, in accordance with regular and established practice in patent cases, the issues of infringement by these later 1956-68 processes would be determined by the special master who would have the benefit of guide lines set forth by this Court at the 3058 trial and the entire 1956-68 processes would be handled as a group following those guide lines. This is not piecemeal litigation but recognized patent procedure.

Furthermore, even if 3058 and 3545 were consolidated for a lengthy trial and if this Court should find infringement in the 1952-1956 and the 1962-1968 periods, any alleged infringing GM processes of the 1956-1962 period not covered by 3545 would still be untried and subject to an accounting. This would be the inevitable result in spite of the fact that this Court had assumed the difficult task of ruling on a great many infringement issues, each with its different evidence, tests, etc. Consolidation will not save any time whatsoever. It will be "piecemeal" in any event.

* * *

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, et al,
Plaintiffs,

v.

GENERAL MOTORS CORPORATION,
Defendant.

CIVIL ACTION
No. 3545

ANSWER OF DEFENDANT TO PLAINTIFFS' INTERROGATORIES DATED SEPTEMBER 20, 1968

[Filed Mar. 3, 1969]

* * *

Interrogatory 3

3. State or identify (whichever applies) the following information as to any lubricating method used in the cold forming of ferrous metals (which has not hereinbefore been identified), where GM allegedly achieves the same results as in the cold forming of ferrous metals wherein prior to or in conjunction with the forming operation (i) a phosphate coating is formed on a ferrous metal, (ii) a film containing soap and borax is thereafter formed over the phosphate coating, and (iii) the coated and filmed workpiece is subsequently subjected to drying:

a. the product formed;

b. the dates and the geographical locations where said forming occurred;

c. the persons participating directly in the technical supervision of the said forming;

d. the chemical formulations of the material used in each said lubricating method as received into GM's plants, the chemical formulations of the solutions used in said lubricating and the steps of each said lubricating method, in terms sufficient to permit accurate sample preparation from base chemicals compounds and reproduction for test purposes and uses; and

e. whether said cold forming is deemed by GM to have been experimental or commercial.

Answer to Interrogatory 3

Defendant is unable to answer this interrogatory as worded because it is indefinite and it contains a false premise that is ascribed to defendant; namely, that there are cold forming processes used by defendant in which defendant allegedly achieves the same results as those achieved from the use of certain processes utilizing soap and borax. Defendant has successfully cold formed metal parts in its experimental and commercial operations by the use of other processes, but has no information with respect to such other processes to appraise whether the results are the "same results" when that expression is given the meaning that it has in this case.

/s/ H.G. Warner
Executive Vice President

[Jurat Omitted in Printing]

IN THE DISTRICT COURT
FOR THE DISTRICT OF DELAWARE
[TITLE OMITTED IN PRINTING]
[FILED APRIL 4, 1974]

PLAINTIFFS' ANSWERS TO DEFENDANT'S ACCOUNTING INTERROGATORIES

* * *

Interrogatory No. A-19:

State, individually as to each of the following processes, which have been used by General Motors during the period covered by the accounting, whether the use of such process constitutes infringement of Claim 4 of Reissue patent 24,017 under paragraph 6 of the amended complaint filed herein on July 17, 1968:

> 1. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of the following composition:
>
> Approximately 75% — sodium tallow soap
> Approximately 25% — tetrapotassium pyrophosphate
>
> and thereafter deforming the metal.

Answer to Interrogatory No. A-19-1:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-2:

2. A process of making axle shafts from ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of the following composition:

Approximately 28% — Sodium tallow soap
Approximately 70% — Borax

and thereafter deforming the metal by drawing the same through a succession of circular dies as described in annexed Exhibit O-3.

Answer to Interrogatory No. A-19-2:

Yes, the United States Court of Appeals, Third Circuit has held soap and borax over phosphate to be an infringement of RE. 24,017; see 467 F.2d 257.

Interrogatory No. A-19-3:

3. The above process wherein any residual lubricant on the metal after forming is removed in a high temperature heat treating process.

Answer to Interrogatory No. A-19-3:

Yes, the Third Circuit Court of Appeals has held soap and borax over phosphate to be an infringement of Re. 24,017; see 467 F.2d 257.

Interrogatory No. A-19-4:

4. A process of making axle shafts from ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of the following composition:

Approximately 51.09% — sodium tallow soap
Approximately 37.5% — trisodium phosphate
Approximately 3.0% — polyglycol

> Approximately 3.5% — sodium metasilicate
> Approximately 5.0% — surfactant
>
> and thereafter deforming the metal by drawing the same through a succession of circular dies as described in annexed Exhibit O-3.

Answer to Interrogatory No. A-19-4:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-5:

> 5. The above process wherein any residual lubricant on the metal after forming is removed in a high temperature heat treating process.

Answer to Interrogatory No. A-19-5:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-6:

> 6. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film composed only of a soap and thereafter deforming the metal.

Answer to Interrogatory No. A-19-6:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-7:

> 7. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film composed only of soap and thereafter deforming the metal, wherein after applying the phosphate coating and before superimposing the fixed film the ferrous metal is rinsed in an aqueous solution containing borax for the purpose of overcoming acid carryover into the soap solution.

Answer to Interrogatory No. A-19-7:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-8:

> 8. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film composed only of soap and thereafter deforming the metal, wherein after applying the phosphate coating and before superimposing the fixed film the ferrous metal is rinsed in an aqueous

> solution containing trisodium phosphate for the purpose of overcoming acid carryover into the soap solution and having no other purpose or effect.

Answer to Interrogatory No. A-19-8:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the compete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-9:

> 9. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition that is in fact as set forth on information in response to Plaintiffs' Interrogatory No. 36 dated on or about January 6, 1961, and thereafter deforming the metal.

Answer to Interrogatory No. A-19-9:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-10:

> 10. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of the composition that is in fact composed of Bonderlube 215 (sodium salt of tall oil fatty acid)

> and thereafter deforming the metal (see answers to Plaintiffs' Interrogatories 2-14 of March 5, 1957).

Answer to Interrogatory No. A-19-10:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-11:

> 11. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of Drycoat DC 1471, constituting in fact, water about 74.4%, coconut fatty acids 8.7%, caustic soda 1.6%, sulfonated tallow 10.0%, and sulfonated caster oil 5.0%, and thereafter deforming the metal (see answers to Plaintiffs' Interrogatories 2-14 of March 5, 1957).

Answer to Interrogatory No. A-19-11:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-12:

> 12. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating, superimposing thereon a dried fixed film composed only of a soap, mechanically

> applying molybdenum disulfide in powder form over the soap, and thereafter deforming the metal.

Answer to Interrogatory No. A-19-12:

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Interrogatory No. A-19-13:

> 13. A process of working ferrous metal within paragraph 6 of the amended complaint filed July 17, 1968 wherein the lubricant is composed of soap only with a small amount of borax of the order of 3 percent or less for the purpose of overcoming effects of acid carryover from the phosphating step and having no other purpose or effect, and the process conditions are intended to and in fact do encourage and bring about the formation of an adherent coating of zinc stearate over the phosphate coating on the metal being worked.

Answer to Interrogatory No. A-19-13:

Yes, the United States Court of Appeals, Third Circuit has held soap and borax over phosphate to be an infringement of RE. 24,017; see 467 F.2d 257.

Interrogatory No. A-19-14:

> 14. A process of working ferrous metal wherein a ferrous sheet metal blank is first treated with a washing solution containing iron phosphate for the purpose of cleaning the blank and providing an in-

> tegral iron phosphate coating as a base for paint, thereafter a soap and borax solution is coated on the blank and dried to form a fixed film over the phosphate, and the blank is formed into an oil filter shell, wherein the quantity of phosphate coating is so small that the forming process is equally practicable without it.

Answer to Interrogatory No. A-19-14:

Yes, the United States Court of Appeals, Third Circuit has held soap and borax over phosphate to be an infringement of Re. 24, 107; see 467 F.2d 257.

Interrogatory No. A-20:

If any part of the answer to Interrogatory A-19, above, cannot now be answered by Plaintiffs categorically "yes" or "no", state the specific reason why it cannot be so answered, and the specific additional information that Plaintiffs need to know to make such a categorical "yes" or "no" answer.

Answer to Interrogatory No. A-20:

See answers to Interrogatory No. A-19.

Interrogatory No. A-21:

Do Plaintiffs have information that General Motors during the life of Reissue patent 24,017, has used any process other than with a lubricant composed of soap and borax or otherwise specifically charged as an infringement in response to Interrogatory A-19, above, that Plaintiffs contend infringes Claim 4 of Reissue patent 24,017 under paragraph 6 of the amended complaint filed herein July 17, 1968? If so, state specifically the lubricant used in such process, the General Motors unit which used the process, the dates when the process was in use, and the product or products made by the process.

Answer to Interrogatory No. A-21:

Not specifically at this time. After further discovery of defendant's records, if they haven't been destroyed, plaintiffs fully expect to have such information.

* * *

/s/ Hubert L. Shortt

Hubert L. Shortt
President
Technograph, Inc.

[Jurat and Service Omitted in Printing]

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

[Title Omitted in Printing]

[Filed April 22, 1977]

PLAINTIFFS' SUPPLEMENTAL ANSWERS TO DEFENDANT'S INTERROGATORIES NOS. A-19(1) and A-19(10)

Interrogatory No. A-19-1

State, individually as to each of the following processes, which have been used by General Motors during the period covered by the accounting, whether the use of such process constitutes infringement of Claim 4 of Reissue patent 24,017 under paragraph 6 of the amended complaint filed herein on July 17, 1968:

> 1. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of the following composition:
>
> Approximately 75% — sodium tallow soap
> Approximately 25% — tetrapotassium pyrophosphate
>
> and thereafter deforming the metal.

Plaintiffs' Initial Answer to Interrogatory No. A-19-1

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Plaintiffs' Supplemental Answer to Interrogatory A-19-1

The process described in Interrogatory A-19-1 which is further described in Defendant's answer to Plaintiffs' Interrogatory 39 infringes claim 4 of Reissue Patent No. 24,107 under paragraph 6 of the amended complaint filed herein on July 17, 1968.

Interrogatory No. A-19-10

State, individually as to each of the following processes, which have been used by General Motors during the period covered by the accounting, whether the use of such process constitutes infringement of Claim 4 of Reissue patent 24,017 under paragraph 6 of the amended complaint filed herein on July 17, 1968:

> 10. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of the composition that is in fact composed of Bonderlube 215 (sodium salt of tall oil fatty acid) and thereafter deforming the metal (see answers to Plaintiffs' Interrogatories 2-14 of March 5, 1957).

Plaintiffs' Initial Answer to Interrogatory No. A-19-10

Plaintiffs are unable to answer because of the need of further information. In this regard, plaintiffs will need to have the complete manufacturing routing and process specifications for the parts involved and specimen samples of the chemical materials used with which to conduct tests, such as for lubricity.

Plaintiffs' Supplemental Answer to Interrogatory A-19-10

The process described in Interrogatory A-19-10 does not infringe claim 4 of Reissue Patent No. 24,107 under paragraph 6 of the amended complaint filed herein on July 17, 1968.

/s/ Hubert L. Shortt

Hubert L. Shortt

State of North Carolina }
} ss.
County of Forsyth }

On this 18th day of April, 1977 personally appeared before me, a notary public in and for the County of Forsyth, State of North Carolina, Hubert L. Shortt, who stated under oath that on the basis of information and belief the foregoing answers are true.

/s/ Mildred A. Alridge

Notary Public

[NOTARIAL SEAL]

[Certificate of Service Omitted in Printing]

LETTER DATED MAY 3, 1976 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)*

David F. Anderson, Esquire
Potter, Anderson & Corroon
350 Delaware Trust Building
Wilmington, Delaware 19801

Thomas S. Lodge, Esquire
Connolly, Bove & Lodge
1800 Farmers Bank Building
Wilmington, Delaware 19801

Re: Devex Corporation, et al., v. General Motors Corporation — C. A. No. 3058

Gentlemen:

This memorializes some of the matters discussed at our conference of Thursday last, attended by Messrs. Frost and Hibben (along with William Schuetz and Saul Schwartz) for defendant and, at defendants' invitation, Neal Waldrop of Parker, as well as Messrs. Blenko, Zeisenheim and Shortt for plaintiffs.

(1) A hearing on the issues before the Master was tentatively scheduled to begin on Monday, May 2, 1977.

(2) Our next conference will be held on Tuesday, October 12 at 9:30 a.m. (The morning hour has been selected in the expectation that counsel for both sides will be coming to Wilmington the day before and meeting together, as occurred with good results preceding Thursday's conference.)

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* Contained in CCA3 Accounting Appendix, pps. A474-9 to A474-11.

(3) Plaintiffs indicated that they hopefully expect their testing will be completed by the end of the summer. They advised that tests have been ordered from McCrone (sp.?) Labs of Chicago to determine the composition of several substances. The balance of the items to be tested by it will likely be given to McCrone in a group after the answers to GM's currently outstanding interrogatories and plaintiffs' cross-interrogatories to various of GM's suppliers. Dr. Rabinowitz (sp.?) will be conducting tests over the summer dealing with the results obtained by the use of those substances which plaintiffs believe may be the subject of infringement charges.

(4) As before, reports from plaintiffs' experts will be furnished defendant with reasonable promptness after they are received. Defendant will continue to do likewise. Each side was favorably inclined toward the principle of making its experts available to its opponent for the duplication of tests. (It was recognized that this could pose some problems in terms of expense, etc., which the parties indicated they would try to work out.)

(5) Plaintiffs' efforts to develop the number of component parts produced by allegedly infringing processes at GM's Saginaw plant has proceeded very slowly. Three months have passed and the job appears to be no more than half done. There are still some twenty divisions to go. The experience at Saginaw has strongly suggested that it would be most desirable for the parties to use their best efforts to develop mutually acceptable shortcuts for the calculation of the approximate number of parts produced by what plaintiffs view as infringing processes. Recognizing that slide rule precision may be impractical, both sides indicated that they would use their best efforts in the direction of trying to reach substantially accurate figures. (It was agreed that this would be a matter of high priority, since the year-away trial date will be a mirage unless it is resolved.)

(6) Defendant indicated it would be submitting a set of interrogatories quite soon to get details in respect of plaintiffs' claims of infringement, recognizing that the interrogatories may not be susceptible of complete answer (or possibly answer at all) until after plaintiffs' testing is completed. This, and other discovery designed to identify the infringement charges, and defenses, will be ongoing.

* * *

I continue to be entirely satisfied that both sides are working hard to try to get this matter to a point where it can be heard by the Master. With continued good effort I am hopeful the May 2, 1977 trial date can be met.

Very truly yours,

/s/ ____________________
Bruce M. Stargatt

BMS:jv

LETTER DATED NOVEMBER 2, 1976 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)*

David F. Anderson, Esquire
Potter, Anderson & Corroon
350 Delaware Trust Building
Wilmington, Delaware 19899

Thomas S. Lodge, Esquire
Connolly, Gove & Lodge
1800 Farmers Bank Building
Wilmington, Delaware 19899

Re: *Devex v. General Motors*

Gentlemen:

This letter aims at setting down on paper various of the matters discussed at Wednesday's conference attended by Messrs. Frost, William Schuetz and Saul Schwartz for defendant, as well as Messrs. Ziesenheim and Leonard Alstadt for plaintiffs.

1. *Trial Date* — A hearing on the issues before the Master will begin on Monday, January 16, 1978. While the parties estimate that the probable trial time will run two months or so, all of us (plaintiffs, defendant and the Master) will reserve an additional month so that the matter can proceed continuously if more than the estimated time of the trial is required.

2. *Next Conference* — Our next conference will be held on Wednesday, January 26 at 9:30 a.m. It was thought that it would be better to have conferences at three-month intervals from here forward. The conferences themselves provide a

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* Contained in CCA 3 Accounting Appendix, pps. A474-14 — A474-19

discipline toward organizing the case, and the firmness of the trial date makes it desirable for the Master to keep current as to the development of the parties' preparation.

3. *Infringement Charges; Testing*

(a) Plaintiffs have indicated that they are now in a position to finally make many of their infringement charges. They are in the process of assembling the required information, and will make their charges promptly.

(b) It had been expected that testing by plaintiffs' experts would be completed at the end of this Summer past. Until the testing is concluded the infringement charges cannot be finalized.

Respecting the McCrone laboratory test program, as I understand it the only tests remaining to be done relate to the question of whether parts claimed to have no borax coating are in fact coated with borax. Although an identification of the chemicals in the substances have been furnished, at least in the case of Jones and Laughlin (involving pre-coated steel) McCrone has advised plaintiffs that the information furnished was not correct. The tests remaining to be done by McCrone have been ordered, and await only completion. Plaintiffs do not believe that they will have a broad effect on the infringement charges.

While the McCrone tests are designed to prove the chemical content of the substances and coatings tested, the Rabinowicz tests center on questions of lubricity and cleanability. Because there are perhaps fifty different possibly infringing (plaintiffs contend) processes used by GM, plaintiffs suggest that the running of tests by Rabinowicz on each of the processes would be prohibitive in terms of time and expense. Rabinowicz proposes to suggest several typical processes (perhaps six), the results of which he is satisfied can be said to apply to all the processes. While I cannot pre-judge the typicality question, *i.e.*, whether the processes tested are so close to the untested processes as to make the tests applicable to untested processes, I did indicate that the concept does not strike me as irrational. I suggested that as soon as Rabinowicz advises as to the processes he believes are typical, and explains why, plaintiffs will furnish defendant in writing with that information. If defendant disagrees with the Rabinowicz approach, it will advise plaintiffs and will itself explain why. In that way, assuming there is no agreement on the point, plaintiffs will have before them prior to the tests a statement of defendant's position and the underlying reasons for it. Rather than proceeding blindly, they can then evaluate defendant's position and reasoning in making its own final decisions as to the Rabinowicz tests.

In all events it is important that the Rabinowicz tests proceed promptly. Plaintiffs advise that they cannot complete their infringement charges until those tests are concluded. And defendant may not be able to make any final decisions as to what tests of its own it wishes to develop, or whether it wishes to proceed with inter-parties tests, until Rabinowicz' results are reported.

4. *Other Matters* — I want to take the time to set down on paper the discussions which were had among the Master and counsel respecting the proposed trial.

Two and one-half years have expired since the March 15, 1974 order of reference. During that period, at least up until this past summer's afflictions to Messrs. Blenko and Buell, I have been well-satisfied that the parties have worked hard to prepare the case for the hearing.

At the conference on Wednesday plaintiffs expressed the view that it might take eighteen months before the case could be readied for trial. General Motors felt that less time might be required, although as defendant it is somewhat less control over the readiness of the case since it must react to plaintiffs' charges and contentions. The January, 1978 date does not give plaintiffs all the time they might have liked, but I am satisfied that in the aggregate (almost four years from the order of reference) it is reasonable.

One of the major hurdles which plaintiffs have felt themselves obliged to surmount in preparation for the hearing derives from what I understand to be their theory of damages. As best I can put it, plaintiffs indicate that they wish to prove savings and gains in the use of the allegedly infringing processes on the theory that those savings and gains would have been taken into account by hypothetical bargainers in negotiating out the supposititious reasonable royalty to which plaintiffs would have been entitled absent the appropriation of the patented processes by GM. I have previously indicated, although tentatively, that such evidence does seem to me to have at least arguable relevance.

But plaintiffs say that their theory obliges them not only to consider savings and gains at the beginning of the use of the patented processes, but to prove *actual* savings and gains during the entire period of the alleged infringement. Their theory is that such would have been a necessary part of the royalty measure developed by the reasonable licensor and licensee in their hypothetical negotiation since it supplies the best proof of value of the patent to GM. To assemble the information as to savings and gains during the entire period of infringement as to each allegedly offending process requires (a) the determination of the manufactured cost of each item, (b) the development of a formula to be applied to manufacture costs so as to come out with a savings in dollars, and (c) the calculation of the number of parts manufactured by the infringing process, the parts figure to be used as a multiple to derive a total gross savings for each process.

Plaintiffs' approach has required the expenditure of prodigious effort. Even at GM's Saginaw Plant, toward which literally hundreds of lawyer hours have been devoted by both plaintiffs and GM, the job is not yet completed. And, while plaintiffs believe that Saginaw is by far the most difficult of the GM divisions to develop, there are still many other (perhaps twenty) divisions to go.

General Motors has indicated that it will oppose future discovery at its other divisions should plaintiffs decide to duplicate at those divisions the Saginaw exercise. As I understand it GM's opposition stems from its contention that savings and gains are irrelevant at least so far as they seek to span the entire period of infringement since hypothetical bargainers would not base a reasonable royalty on an actual computation of savings and gains during the entire period of infringement. General Motors contends that such would be extremely onerous to compute (as it has proved to be at Saginaw) and would require the disclosure of confidential information to the licensor on a current basis, *viz.*, the cost of manufacture of GM's products.

Rather GM contends that typical licenses, even if they take into account savings and gains, are valued in terms of more objectively and easily ascertainable information such as, in this case, the number of pounds of phosphate, or the cost of same, or in other cases (although it does not concede such to be the proper measure here), the selling price of the article produced as a result of the infringement process. These tests may well be less likely to produce an exact measure of the benefit of the patent to the licensee than would savings in the cost of manufacture. But they have the benefit of being objectively ascertainable on a relatively easy basis.

At the conference both sides, although for different reasons, agreed that the proof of savings and gains during the entire patent period need not be offered at the January 15, 1978 hearing. General Motors is of this view because it feels such to be irrelevant. Plaintiffs are of the same mind because they feel that the Master will find their proposed measure as the appropriate measure of damages. Assuming the Master adopts plaintiffs' measure, both sides agreed that a dollars and cents award could be left for a later day, postponing heavy discovery which might in the end be unnecessary.

For the guidance of the parties, I expressed the conviction that the Court would wish for me to hold one trial at which all the parties' contentions can be advanced, and determined. The case has gone on for so many years that the hearing before me ought to supply at least the first chapter in the final volume. By that I mean I had expected that I would be rendering a complete report after consideration of all the evidence, with no loose ends. So I reacted against the idea of leaving as a possible overhang the translation of the measure of the damages into a particular dollar figure, a result which is possible under the parties' joint proposal.

On the other hand, to make a ruling at this stage on whether plaintiffs' measure of damages theory is correct would retard the ultimate trial date, and deflect the parties from the discovery required to meet it. Since both sides are in agreement that trial can reasonably and effectively be completed without the present need for the proposed discovery, I indicated that we would go forward on that basis.

In so doing I cautioned plaintiffs of the risk of putting all their eggs in a single theory-of-damages basket. They may wish at the hearing to present additional or alternative theories and proofs of damage so as to guard against the risk that if their first contention is not accepted, the Master will have no proof on which an award might be based. On this point for the guidance of the parties I advised of my reaction (and it is only a reaction) that hypothetical bargainers might be hesitant to adopt a measure of license value which would require as much effort as plaintiffs have and will be obliged to exert to determine savings and gains during the entire patent period in this very case. In saying this I did not and do not mean to say that plaintiffs' theory is devoid of merit, or that it will be unsupported by convincing evidence. But, while having an open mind on the subject, it seemed only fair to suggest that plaintiffs might not wish to risk the adverse results which would flow from its failure to offer alternative damage contentions and evidence to protect against the risk that its main contention may be rejected.

By the same token I advised defendant, which contends that the evidence will show there is no basis for making a substantial award of damages, against sanguinely assuming that such will be my conclusion. Should defendant fail to offer its own evidence as to an appropriate measure, and a proposed dollar figure, I will have before me only plaintiffs' proofs.

These reactions are, of course, subject to further consideration. But I expressed them, and think it only proper that they be recorded.

Very truly yours,

/s/________________
Bruce M. Stargatt

BMS:jv

IN THE U.S. DISTRICT COURT FOR DISTRICT OF DELAWARE
[TITLE OMITTED IN PRINTING]
[FILED MAY 27, 1977]

PLAINTIFFS' SECOND SET OF SUPPLEMENTAL ANSWERS TO DEFENDANT'S INTERROGATORY NOS. OB-1 AND OB-2

Defendant's Interrogatory OB-1

State, individually as to each of the following processes which have been used by the Oldsmobile Division of the General Motors Corporation to make bumpers, whether the use of such process constitutes infringement of Claim 4 of Reissue Patent No. 24,017 under paragraph 6 of the amended complaint filed on July 17, 1968:

1. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a dry film of DQ-593 and thereafter deforming the metal, as referred to in GM's Answer to Plaintiffs' Interrogatory No. 36, filed January 24, 1961, the DQ-593 being made as set forth in Wojtowicz's deposition, Defendant's Accounting Exhibit Nos. 33 and 34.

2. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a dry film of DC-1471, and thereafter deforming the metal, as set forth in answer to Plaintiffs' Interrogatory Nos. 2-14 of July 8, 1957, the DC-1471 being made as set forth in the Wojtowicz's deposition, Defendant's Accounting Exhibit No. 36.

3. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating

and superimposing thereon a lubricant film of DX-1101, and thereafter deforming the metal, the DX-1101 being made as set forth in the Wojtowicz deposition, Defendant's Accounting Exhibit No. 38.

4. A process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a lubricant film of DA-2481, and thereafter deforming the metal, the DA-2481 being made as set forth in the Wojtowicz deposition, Defendant's Accounting Exhibits 39A-39D.

Plaintiffs' Initial Answer to Defendant's Interrogatory OB-1

Plaintiffs are unable to answer because of insufficient information and the need of further and complete information. In this regard, Plaintiffs will need to depose a person or persons who has or have knowledge of and can speak for and about the Oldsmobile Division and not limited in scope to a particular department or a particular part. Plaintiffs are concurrently filing herewith the appropriate Notice of Taking Depositions.

Plaintiffs' First Supplemental Answer to Defendant's Interrogatory OB-1

The process described in Defendant's Interrogatory OB-1-1 does not correspond to the process revealed by the discovery to date. The discovery to date has revealed the addition, to the chemicals described in this interrogatory, of Montgomery 36-B. The process of cold forming ferrous metal which comprises forming on that metal a coating of phosphate, then coating said metal with Montgomery DQ-593, then coating said metal with Montgomery 36-B, and then cold forming said metal, said process being used from March, 1952 through 1953 by Oldsmobile Division to produce bumpers, infringes Claim 4 of Reissue Patent No.

24,017. The fixed film is a combination of Montgomery DQ-593 and Montgomery 36-B; the solid meltable organic binding material is a soap based material: the solid inorganic compound is calcium carbonate; see Plaintiffs' Answer to Defendant's Interrogatory A-39-4 in regard to temperatures at which the solid inorganic compound is meltable. No tests have been made of this coating.

The process described in Defendant's Interrogatory OB-1-2 does not correspond to the process revealed by the discovery to date. The discovery to date has revealed the addition, to the chemicals described in this interrogatory, of Montgomery 36-B. The process of cold forming ferrous metal which comprises forming on that metal a coating of phosphate, then coating said metal with Montgomery DC-1471, then coating said metal with Montgomery 36-B, and then cold forming said metal, said process being used from 1953 through 1958 by Oldsmobile Division to produce bumpers, infringes Claim 4 of Reissue Patent No. 24,017. The fixed film is a combination of Montgomery DC-1471 and Montgomery 36-B; the solid meltable organic binding material is a soap based material; the solid inorganic compound is calcium carbonate; see Plaintiffs' Answer to Defendant's Interrogatory A-39-4 in regard to temperatures at which the solid inorganic compound is meltable. No tests have been made of this coating.

The process described in Defendant's Interrogatory OB-1-3 does not correspond to the process revealed by the discovery to date. The discovery to date has revealed the addition, to the chemicals described in this interrogatory, of Montgomery 36-B. The process of cold forming ferrous metal which comprises forming on that metal a coating of phosphate, then coating said metal with Montgomery DX-1101, then coating said metal with Montgomery 36-B, and then cold forming said metal, said process being used from 1957 through March, 1960 by Oldsmobile Division to produce bumpers, infringes Claim 4 of Reissue Patent No. 24,017. The fixed film is a combination of Montgomery DX-1101 and Montgomery 36-B; the solid meltable organic binding material is a soap based material; the solid inorganic compound is calcium carbonate; see Plaintiffs' Answer to Defendant's Interrogatory A-39-4 in regard to temperatures at which the solid inorganic compound is meltable. No tests have been made on this coating.

The process described in Defendant's Interrogatory OB-1-4 does not correspond to the process revealed by the discovery to date. The discovery to date has revealed the addition, to the chemicals described in this interrogatory, of Montgomery 36-B. The process of cold forming ferrous metal which comprises forming on that metal a coating of phosphate, then coating said metal with Montgomery DA-2481, then coating said metal with Montgomery 36-B, and then cold forming said metal, said process being performed and used, from March, 1960 through 1965, by Oldsmobile Division to produce bumpers, infringes Claim 4 of Reissue Patent No. 24,017. The fixed film is a combination of Montgomery DA-2481 and Montgomery 36-B; the solid meltable organic binding material is a soap based material; the solid inorganic compound is calcium carbonate; see Plaintiffs' Answer to Defendant's Interrogatory A-39-4 in regard to temperatures at which the solid inorganic compound is meltable. No tests have been made on this coating.

Plaintiffs' Second Supplemental Answer to Defendant's Interrogatory OB-1

In identifying calcium carbonate as the inorganic compound in their supplemental answer to this interrogatory plaintiffs were, of course, referring to the phenomenon described in column 9 of the Henricks patent wherein the calcium carbonate reacts with tallow soap under heat to form calcium stearate and sodium carbonate. In this context, the calcium carbonate is equivalent to the fusible pigment calcium stearate which is listed in Table I of the patent.

Nevertheless, plaintiffs hereby withdraw their tentative charges of infringement for the Oldsmobile practices identified in defendant's interrogatories OB-1 and OB-2. The discovery to date has revealed that the Montgomery 36-B was applied intermittently and the question remains open as to whether the process was wet or dry. The prospective amount of recovery from proving that these practices infringe the Henricks patent and in determining the savings and gains resulting from the infringement do not appear to justify the costs of such proofs. Therefore, plaintiffs elect not to press charges of infringement against these Oldsmobile practices.

Defendant's Interrogatory OB-2

If any process described in Interrogatory OB-1 is charged as an infringement state, as to such process:

1. What is the fixed film referred to in Claim 4?

2. What is the "solid meltable organic binding material" of Claim 4?

3. What is the "solid inorganic compound" of Claim 4?

4. What is the temperature at which such "solid inorganic compound" is meltable?

5. Have Plaintiffs, or anyone acting by or for them, made any chemical analysis, tests or otherwise acquired information that supports or tends to support the presence of the "solid inorganic compound" or the melting point thereof.

If so:

a. State whether there is any document or writing that describes all or any part of the analysis, tests or other thing done on all or any part of the results obtained, state the date of each document, the subject matter of the same, and when and where Plaintiffs will produce a copy for inspection by Defendant.

b. As to each such item of analysis, test or other information, state the name, employer and present or last known address of each person who (1) conducted or observed the analysis or tests or otherwise acquired the information and (2) has knowledge of the results thereof.

Plaintiff's Initial Answer to Defendant's Interrogatory OB-2

See answer to Defendant's Interrogatory OB-1.

Plaintiff's First Supplemental Answer to Defendant's Interrogatory OB-2

See Plaintiffs' Supplemental Answer to Defendant's Interrogatory OB-1.

Plaintiffs' Second Supplemental Answer to Defendant's Interrogatory OB-2

No answer required in view of plaintiff's decision not to press charges of infringement against the processes described in Interrogatory OB-1.

/s/ Hubert L. Shortt

Hubert L. Shortt

[Certificate of Service Omitted in Printing]

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

[Title Omitted in Printing]

DISPOSITION OF PRODUCTION REQUESTS CONTAINED IN PLAINTIFFS' LETTER OF MARCH 2, 1978**

At a conference before the Special Master on March 15, 1978, consideration was given the requests for documentary production contained in plaintiffs' letter of March 2, 1978. This letter was sent as the result of a meeting by the parties with the Special Master on February 27 at which it was suggested that plaintiffs identify in writing the documents they needed but did not yet have in the quantitative (damages) area. On March 13, 1978, defendant filed a twenty-seven page list of comments directed to plaintiffs' requests. The issues created by defendant's positions respecting plaintiffs' requests were considered at the March 15 hearing.

To resolve such differences as existed between the parties a balance needed to be struck betweeen plaintiffs' legitimate efforts to secure precise information to sustain their theory of the case, and defendant's legitimate desire to be protected against excessively burdensome discovery. (See Special Master's letter of November 16, 1977, pp. 3-5.) Applying these considerations, the following dispositions were made of plaintiffs' requests:*

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* The quoted paragraphs which follow are directly from plaintiffs' March 2 letter.

** contained in CCA3 Accounting Appendix, pps. A474-51 through A474-72.

"(1) Brown-Lipe-Chapin Appropriation Requests (AR's)

In my letter of December 15, 1977 to Saul Schwartz, we identified and requested certain Appropriation Requests of the Brown-Lipe-Chapin Division after reviewing an index of the Finance Committee in New York. With respect to each Appropriation Request we have requested the file, the economic justification studies and the actual results of the first year's operations whether or not submitted to the Cost Analysis Section in Detroit. In addition, we have requested the pre-1958 index to the Appropriation Requests for that division. We understand that you are to advise us whether the above are available and if not available, why unavailable and if destroyed, when destruction took place."

Disposition:

Reasserting its position that all savings and gains will ultimately be held to be irrelevant in pursuit of the ultimate reasonable royalty question (a position rejected by me for discovery purposes but preserved for ultimate determination), defendant particularly urged that the appropriation requests (AR's) listed in the December 15, 1977 letter referred to above included three AR's which were remote in time (AR's 152-3, 167-3, and 174-1).* I indicated that my reaction was to agree with defendant's position. After consideration, the request pertaining to the demand relating to these three AR's was withdrawn by plaintiffs.

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* In each case defendant's position is fully set forth in its "comments" on plaintiffs' document request filed with the Master on March 14, 1978, as supplemented and sometimes modified during the course of the conference.

As to the balance of plaintiffs' requests (AR's 202-1, 202-2, and 202-3, and the pre-1958 index to AR's for the Brown-Lipe-Chapin Division), defendant's written response indicated that the AR's themselves have been sought but that at this stage they are "not available". Plaintiffs expressed concern that defendant's representation on the point was unclear. Defendant replied that its search had not been able to locate the requested items. However, defendant requested guidance as to the depth of the investigation it ought to be making. Defendant pointed out that an exhaustive investigation would likely require an enormous number of hours, with the continuing strong possibility that in the end it would simply find that the records (in this case more than twenty years old) are gone without being able to pinpoint with any precision whether they were in fact destroyed and, if they were, when the destruction occurred. It argued that to require such an investigation would be unfair.

The records sought are but one bit of proof in plaintiffs' broader effort to make its savings and gains case. Despite its continued objection to the relevance of information relating to savings and gains, defendant has produced vast quantities of materials in response to plaintiffs' requests. The materials produced, although in many cases very old, have been produced as the result of defendant's prior investigation. I indicated that in responding to plaintiffs' pending requests defendant's obligation will be to conduct a reasonable investigation. Although the words are not subject to precise quantification, it may provide help for present purposes to consider a reasonable investigation as that investigation which a prudent businessman would conduct in an effort to retrieve data which, if located, would have some importance in the conduct of his business, or, put another way, an investigation which is more than superficial or perfunctory but less than leave-no-stone unturned exhaustive.

Defendant represented that its investigation had come up dry with respect to the Brown-Lipe-Chapin appropriation requests numbered 202-1, 202-2, and 202-3, and the pre-1958 index to the AR's for that division. If defendant is satisfied that its investigation has been reasonable, it need do no more. Otherwise it shall conduct a reasonable investigation for the requested materials.

> **"(2) New Departure-Hyatt AR's**
>
> In my letter of December 15, 1977 to Saul Schwartz, we identified and requested certain Appropriation Requests of the Hyatt Bearings Division after reviewing an index of the Finance Committee in New York. On December 16, 1977 we inspected the index to the Executive Committee AR's in Detroit and identified and requested certain Appropriation Requests from Hyatt Bearings and New Departure-Hyatt which request was hand-delivered to you on that day. With respect to each Appropriation Request, we have requested the file, the economic justification studies, and the actual results of the first year's operations whether or not submitted to the Cost Analysis Section in Detroit. In addition, we have requested the pre-1958 index to the Appropriation Requests for that division. We understand that you are to advise us whether the above are available and if not available, why unavailable and if destroyed, when destruction took place. You have advised us that the following Appropriation Requests have been located and are in the process of being forwarded to us from the above mentioned requests: A5181, A5329, and A5688."

Disposition:

Defendant agreed to produce the appropriation requests which it has been able to locate, even though seven of them relate to periods long after the termination of the infringement charge. As with Brown-Lipe-Chapin, it will be obliged to make a reasonable investigation to determine whether the presently unlocated appropriation requests and the pre-1958 index are available and, if they are not, why not.

> **"(3) Pontiac Motor AR (PM 371)"**

Disposition:

Defendant agreed to supply.

> **"(4) Oldsmobile AR 728"**

Disposition:

Defendant agreed to supply.

> **"(5) Detroit Forge AR"**

Disposition:

Defendant agreed to supply.

> **"(6) Saginaw Steering Gear AR's 2906, 3034, 3075**
>
> Even though these AR's are dated after the date of expiration of the patent, our reason for requesting them is that the data contained therein may aid plaintiffs' experts in estimating the savings on other changeovers within the patent period and for which plaintiffs have been unable to obtain pertinent AR's, economic justification studies or costs and savings data. In addition, defendant has contended in selected instances that information on certain practices post the expiration of the patent are rele-

> vant and have set forth that contention in the draft of the pre-trial order. Defendant's position is therefore inconsistent in the pretrial order with the position it is taking in this item. (Saul Schwartz advised that two Saginaw Steering Gear AR's not previously produced (2069 and 2850) have been located and are available for inspection.)"

Disposition:

As to this request defendant had advised it has located AR's 2906, 3034, and 3075. In its position paper and during the course of the hearing, defendant objected to production on the grounds of relevance and because of remoteness in time since they related to equipment and processes installed after the expiration date of the patent. It also indicated that it was concerned that, if produced, these AR's would give rise to additional discovery requests which would be time-consuming.

I indicated that I would not sustain the relevance objection at this stage, and would not rule on discovery requests which might stem from the production of these AR's until such requests were made. However, I stated that I would be disposed to sustain defendant's objection on the ground of remoteness, particularly since the AR's involved related to processes put into place after the expiration date of the patent.

Plaintiffs asserted that they believe defendant will itself be relying on post-expiration date events as a part of its case, and that if so, defendant's position with respect to these AR's would be inconsistent with that reliance.* That will be for

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* To the extent that plaintiffs refer in their letter to a draft of the pre-trial order, let me repeat my view that the pre-trial order should be drafted entirely without prejudice. Nothing in it should be used to cement either party into a position. The drafting of the pre-trial order will be materially expedited if the parties feel themselves free to take tentative positions and make tentative submissions, without running the risk of having those

continued on next page

another day. For now I can only react to matters as they come up. What effect defendant's position in this respect will have on its effort (if it makes the effort) to rely on post-expiration events in other respects will be determined when and if that question arises. If defendant wishes now to press its objection on the ground of remoteness in time I am disposed to sustain it. Otherwise it will produce AR's 2906, 3034, and 3035.

> **"(7) Buick Motor AR Backup File**
>
> Plaintiffs request relates to File AR 2287. If that file is not available, please state why and if destroyed, when destruction took place"

Disposition:

Defendant has represented that AR 2287 and the follow-up study relating to it were produced and marked as exhibits at a deposition in 1975. Defendant represented that reasonable investigation did not disclose the existence of a follow-up file, and that to the extent one may have existed it was probably thrown away as useless. Defendant need do no more on this.

> **"(8) Review of Inland AR's prior to 1958**
>
> At the inspection of Inland Division on February 9th, 1978 there was insufficient time in which to examine the AR's prior to 1958. If none of said AR's is relevant to any of the items or practices which plaintiffs have accused, then please so advise in response hereto."

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continued from previous page

submissions and positions used against them. The pre-trial order will become binding only when it is signed in final form, and until then the parties may go through the drafting process secure in the knowledge that I will not hold against either side what is in the tentative drafts.

Disposition:

Defendant advised that there are no AR's prior to 1958 relating to the accused processes.

> "(9) **Chevrolet Bumper Engineering Drawings for Model Years 1958-1960**
>
> Plaintiffs understand that there are voluminous engineering drawings for many bumper parts and therefore choose as representative the part numbers for the model years stated in Exhibit A hereto and request engineering drawings for same."

Disposition:

Defendant agreed to supply such engineering drawings as plaintiffs themselves identify and request. Plaintiffs agreed to make a more exact and pointed selection.

> "(10) **Burden Figures Requests**
>
> The Special Master ruled that plaintiffs are to make their request for burden figures within three days from their receipt of AR's or within 3 days from February 27, 1978, whichever is later. Plaintiffs request for burden figures is set forth in Exhibit B, Burden figures should contain a breakdown between variable burden, fixed burden, super burden and premiums as applied to direct labor costs in the department where the item was manufactured under the previous method and in the department where the item was manufactured under the accused practice."

Disposition:

Defendant indicated in its position paper and at the hearing that it will continue to use its best efforts to supply the burden figures requested.

(New Request)

"(1) Inspection of cold forming study referenced in Delco Products AR No. 4135"

Disposition:

Defendant agreed to supply if it can be located by reasonable investigation.

(New Request)

"(2) Ball Joint Studs at Chevrolet Bay City

Plaintiffs requested production of AR's, economic justification studies or files relating thereto and any actual followup studies for the first year of operation under the accused practice."

Disposition:

Defendant in its position paper represented that it had previously produced the materials requested in this paragraph, and that those materials continue to be available for inspection. At the hearing defendant advised that it had conducted a reasonable investigation, and that such investigation had disclosed only the documents previously and presently offered for inspection. Defendant need do no more respecting this request.

(New Request)

"(3) Defendant will please state whether the index to the AR's and the AR's of Delco Products for the period prior to 1965 were destroyed and if so, when destruction took place."

Disposition:

In its position paper defendant suggested that the requested Delco AR's and index to such AR's were not "handy". At the hearing defendant represented that it had made a reasonable investigation relating to such AR's and that it could not locate them or ascertain what had happened to them. I indicated that this representation would be accepted, and that no more would be required.

(New Requests)

"(4), (5), (6)

> Plaintiffs request inspection of all files of GM divisions that were kept in the regular course of business relating to the patent in suit that were transferred to the possession of George Frost, Bill Schuetz, Saul Schwartz or the Patent Department and from which defendant may take documents in the defense of this action. The Special Master denied plaintiffs' request except that plaintiffs are permitted to inspect the specific files of Hyatt Bearings Division from which documents have been sent to plaintiffs by Mr. Schwartz under date of December 21, 1977 and January 3, 1978 and the specific files of Chevrolet-Cleveland (Parma) from which Mr. Schwartz took two documents and forwarded same to plaintiffs; the two documents are identified as follows: A Report on Advantages of 100% Extrusion of Passenger U.J. Bearing Race, dated October 10, 1961 and Report on Cold Extrusion Practices at Chevrolet-Cleveland, dated February 24, 1961."

Disposition:

I had previously indicated, and again advised, defendant would not be obliged to produce documents simply because those documents were in the files of its attorneys. Any documents which may be relevant (and not privileged) are, of course, subject to production. The non-privileged materials contained in files kept by defendant relating to the patent in suit have, presumably, already been produced. The transfer of files to counsel neither improves nor diminishes their produceability.

Respecting the specific materials requested, defendant's position paper offers the Hyatt documents collected by Mr. Schwartz, and Mr. Schwartz at the hearing stated that the two Chevrolet-Cleveland (Parma) documents referred to did not come from any larger file to his knowledge, but rather were handed to him separately. He stated that he is aware of no more generalized file.

> (New Request)
>
> **"(7) Pontiac Legal File in connection with lawsuit**
>
> The Master denied plaintiffs' request to inspect the file of Pontiac relating to its operations that were deemed to be relevant to the litigation by Mr. Taunt and which were set aside and designated legal file after he was notified of the commencement of the litigation, without prejudice to plaintiffs seeking a further ruling upon more expanded request."

Disposition:

Defendant agreed to produce such documents in the Taunt file as are covered by plaintiffs' discovery requests. If, after inspecting such documents, plaintiffs wish more, they should make further application.

> (New Request)
>
> **"(8) Production of economic justification studies made on all cold forming processes charged. All Divisions.**
>
> Plaintiffs requested the same in their Request for Production of Documents pursuant to Rule 34 of the Federal Rules of Civil Procedure served in October of 1977. That request for production of documents includes all AR's relating thereto which have not been produced to date and inspection of

> the files relating to the cold forming practices charged. Please advise us whether the above are available, and if not available, why unavailable, and if destroyed, when destruction took place."

Disposition:

I had indicated in November, 1977 that the requests contained in the request for production filed under Rule 34 on or about October 27, 1977, were overly broad. They imposed on defendant so great an onus that, if it were obliged to fully comply, the practical effect would be to unacceptably delay the accounting. Since the filing of plaintiffs' October 1977 production requests, as in other discovery areas, efforts have been made by both sides to reach an accommodation between the outer limits of what might be permitted, and the practical exigiencies of the litigation.

In furtherance of this effort, plaintiffs restricted the request in the above paragraph to defendant's Saginaw and the Delco Remy operations.

Respecting Saginaw, defendant represented that it had made a reasonable search for economic justification studies and AR's, and had been unable to locate any documents other than those already furnished by Mr. Schuetz. Plaintiffs themselves earlier on in the case spent months at Saginaw. I am satisfied that defendant had done enough on this.

As to Delco-Remy, plaintiffs limited their requests to the twelve numbered items on page 5 attached to Mr. Bender's letter of March 14, 1978. I believe that at the hearing Mr. Schuetz exposed a chart relating to Saginaw, and that it was agreed that such economic justification studies as had been or will be turned up through reasonable investigation will be made available relating to these items.

(New Requests)

"(9) and (10)

Production of all follow-up studies made in connection with Item 8; Production of Documents from cost analysis section in GM Building in connection with Item 8 or any Appropriation Requests

The Special Master granted this request since GM at the previous hearing had stated that whenever it could obtain actuals it preferred the same."

Disposition:

Defendant agreed to supply.

(New Request)

"(11) All documents that show economic justification, advantages or benefits relating to a changeover to cold forming practices including without limitation the documents of committees such as cold forming committees, plating committees, design committees, steel committees, etc.

Plaintiffs' request is limited to bumpers manufactured at Chevrolet-Livonia, Pontiac, Oldsmobile and Cadillac to cold extrusion at Saginaw Steering Gear and Delco-Remy divisions where AR's or economic justification studies have not been provided on specific accused parts."

Disposition:

To the extent not previously produced or identified, defendant will comply with the requests contained in this paragraph and will produce such documents as are disclosed by reasonable investigation. Defendant expressed doubt that more would come of this since it had (it advised) already completed its effort to comply with plaintiffs' request for committee documents.

(New Request)

"(12) Plaintiffs request inspection of the following items re bumper manufacturing at Chevrolet-Livonia for the 1958-1960 model year.

"a., b., c., d. Plaintiffs limit their request to efficiency reports on a weekly, monthly and yearly basis.

"e. and r. Scrap Reports. Actuals on a monthly and yearly basis. If actual is unavailable, then defendant is to provide scrap allowance — as budgeted (subparagraph r.).

"f., g., h., and i. The plaintiffs limit their request to actual production reports on a weekly, monthly and yearly basis.

"j. and k. Monthly and yearly statements of gross billings and cost of billings. Plaintiffs withdraw this request if they receive efficiency reports, production reports, actual burden rate information and actual costs by part number.

"l. Yearly billings and cost of billings for '57-'60 calendar years. Same as explanation in j. and k. above.

"m. and n. A breakdown of budget and actual burden rate information between variable, fixed, and super burden and premiums.

"o. and p. Monthly and yearly manufacturing expense budgets. Withdrawn in light of requirement

to furnish actual and budgeted costs by part number in q. and q' below.

"*q. and q'* Budget and actual costs by part number. This includes a breakdown between material, labor and burdens.

"*r.* (See explanation in e above).

"*s.* Monthly plant reports. Same as explanation in j. and k. above.

"*t. and u.* Journal vouchers and ledgers. Same as explanation in j. and k. above.

"*v., w., and x.* Weekly, monthly and yearly reports showing percent of bumpers made OK. Withdrawn in light of requirement to furnish items b., c., d., g., h. and i."

Disposition:

Defendant advised that it was using its best efforts to comply with this request to the extent documents are available.

(New Request)

"(13) Same information as enumerated under Item 12 for the 1965-1966 model year period when Bruco 27 was used. Plaintiffs request this information if there is a breakdown in the data between manufacture using Bruco 27 lubricant and the charged infringing practice. If there is no breakdown, then defendants should so state and in that event are not required to supply the information. If there is a segregation cost, defendant is requested to furnish efficiency and production data respecting on the one hand Bruco 27 and on the other hand the accused practice."

Disposition:

Defendant represented that there is no breakdown in the data in its possession between manufacture using Bruco 27 lubricant and the charged infringing practice. If, notwithstanding the absence of the existence of such a breakdown, defendant intends to use the documents in its possession to calculate a breakdown, as part of its own case, it shall give plaintiffs reasonable notice of such intent.

> (New Request)
>
> "(14) Same information enumerated under Items 9 (old) and 12 for switchover period at Pontiac (bumpers) for the model years 1955 through 1957. Plaintiffs believe the budget and actual costs plus engineering drawings for all bumper part numbers for Model years 1955 through 1957 may be sufficient to establish some of the benefits to GM."

Disposition:

Pontiac poses a problem different from Chevrolet because production at the Chevrolet-Livonia plant was almost entirely devoted to bumpers, whereas production at Pontiac involved many products other than bumpers. Hence, there is a breakdown problem. Defendant stated that it had furnished to plaintiffs actual costs for bumpers during the changeover period. It does not have actual production reports on a weekly or monthly basis relating to bumpers only. It will try to locate, and if they are available produce, scrap reports relating to bumpers. It will also produce, to the extent they can be located and have not already been produced, agency reports, budget figures, and burden figures to the extent they relate to bumpers only.

Engineering drawings will be furnished upon precise identification by plaintiffs of what they wish.

(New Request)

"(15) Same information enumerated under Items 9 (old) and 12 for switchover period at Oldsmobile (bumpers) for model years 1958 through 1960. Plaintiffs believe the budget and actual costs plus engineering drawings for all bumper part numbers for Model years 1958 through 1960 may be sufficient to establish some of the benefits to GM."

Disposition:

At the hearing the years covered by plaintiffs' request were changed to "1962 through 1964". Since the problems are similar, it was agreed that the same ground rules prevailing with respect to the Pontiac production covered by Item 14 would also prevail with respect to this item.

(New Request)

"(16) Same information enumerated under items 9 & 12 for switchover period at Cadillac (bumpers) for Model years 1961 through 1962. Plaintiffs believe the budget and actual costs plus engineering drawings for all bumper part numbers for Model years 1961 and 1962 (except No. 147689, 1474693/4/5/6/7) may be sufficient to establish some of the benefits to GM."

Disposition:

Again, the same ground rules prevailing with respect to the Pontiac production covered by Item 14 will also apply to this item.

(New Request)

"(17) On cold extrusion under accused practices and where there are no AR's or economic justification studies or followup (actual) cost study on ac-

> cused parts, plaintiffs request an inspection and copying of GM's records to compare the budgeted cost of manufacture of an accused part by an accused practice with the budgeted cost of manufacture of the same or similar part by the prior manufacturing practice."

Disposition:

At the hearing plaintiffs restricted this demand only to the Saginaw and Delco-Remy operations. Defendant agreed that if reasonable investigation produced no further AR's or economic justification studies or follow-up (actual) cost studies, as requested, they would advise plaintiffs. Plaintiffs would then specify such information from defendant's comparative cost book as they require to help fill the gaps. Defendant will thereafter supply such information.

> (New Requests)
>
> "(18) Covered in Item 2 of Old Requests.
>
> "(19) Review of all AR's at Saginaw Steering Gear covered in paragraphs 8, 9, 10 and 11 in New Requests.
>
> "(20) Review all AR's at Delco-Remy. Same as explanation in paragraph 19.
>
> "Plaintiffs can supply you with a definitive list of needed engineering drawings on cold extrusion parts no later than March 14, 1978. Plaintiffs have previously received a substantial number of drawings from you and have to examine same against its needs. This is a very time consuming task."

Disposition:

The numbered items are covered by dispositions of previous paragraphs.

Respecting engineering drawings, defendant again agreed to supply such drawings as plaintiffs specifically identify.

/s/

Bruce M. Stargatt
Special Master

Dated: March 21, 1978

IN THE U.S. DIST. CT. FOR THE DIST. OF DEL.

[Title Omitted in Printing]

[Dated Nov. 30, 1978]

STIPULATION

The parties by their attorneys stipulate as follows:

1. (a) Defendant reserves the right to urge the position that no interest shall be allowed prior to the judgment in this accounting ("pre-judgment" interest) on the amount of any reasonable royalty payable by defendant or, alternatively, that the interest rate, if allowed, shall be a statutory* or other interest rate less than that urged by plaintiffs.

(b) Plaintiffs reserve the right to urge the position that pre-judgment compound interest shall be allowed on the amount of reasonable royalty payable by defendant or, alternatively, that at least simple interest shall be allowed.

2. (a) If interest is awarded on any money judgment herein for reasonable royalties at the prevailing interest rates, it shall be at those shown in Moody's Industrial Manuals and Moody's Bond Record Monthly as the Moody's corporate bond yield composite averages for the applicable periods.

(b) For the full years ending December 31, 1953 through December 31, 1977, such prevailing interest rates are shown by the following table and for subsequent years they shall be computed in the same manner and prorata for part of a year:

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* e.g. 6 Del. Code §2301, 28 U.S.C. §1961

1977	8.43
1976	9.00
1975	9.57
1974	9.03
1973	7.80
1972	7.63
1971	7.94
1970	8.51
1969	7.36
1968	6.51
1967	5.82
1966	5.34
1965	4.64
1964	4.57
1963	4.50
1962	4.62
1961	4.66
1960	4.73
1959	4.65
1958	4.16
1957	4.21
1956	3.57
1955	3.25
1954	3.16
1953	3.43

(c) If the simple pre-judgment prevailing interest is allowed it shall accrue from the end of each year for which a royalty amount is granted to judgment date, and at the prevailing simple interest rates as shown in 2(b) hereinabove through 1977, and as computed pursuant to 2(b) hereinabove for subsequent years.

(d) The following table correctly states that if judgment had been entered on December 31, 1977 with respect to a royalty amount for a year shown at the left column, the accumulated simple pre-judgment prevailing interest on that amount is as shown in Column A for that year and the accumulated simple pre-judgment statutory interest on that amount is as shown in Column B for that year. A table similarly constructed shall be used for any judgment entered.

	Column A	Column B
Year for which Royalties Granted	Accumulated Simple Interest Factor to 12/31/77 (at prevailing rate)	Accumulated Simple Interest Factor to 12/31/77 (at statutory rate)
1952....	147.09	150
1953....	143.66	144
1954....	140.50	138
1955....	137.25	132
1956....	133.68	126
1957....	129.47	120
1958....	125.31	114
1959....	120.66	108
1960....	115.93	102
1961....	111.27	96
1962....	106.65	90
1963....	102.15	84
1964....	97.57	78
1965....	92.94	72
1966....	87.60	66
1967....	81.78	60
1968....	75.27	54
1969....	67.91	48

3. (a) The compound prevailing interest rates shall be based on the prevailing simple interest rates as specified in 2(a) above.

(b) For the full years ending December 31, 1953 through December 31, 1977, they are shown by the table in 2(b) above and for subsequent years they shall be computed in the same manner as specified in 2(a) above and prorata for part of a year.

(c) If pre-judgment compound prevailing interest is allowed it shall accrue from the end of the year for which a royalty amount is granted to judgment date and at the rates stated in 3(b) hereinabove through 1977 and as computed pursuant to 3(b) hereinabove for subsequent years.

(d) The following table correctly states that if judgment had been entered on December 31, 1977 with respect to a royalty amount for a year shown at the left column, the accumulated compound pre-judgment prevailing interest on that amount is shown at Column A for that year and the accumulated compound pre-judgment statutory interest on that amount is shown at Column B for that year. A table similarly constructed shall be used for any judgment entered.

	Column A	Column B
Year for which Royalties Granted	Accumulated Compound interest factor (%) if judgment had been entered December 31, 1977 (at prevailing rate):	Accumulated Compound interest factor (%) if judgment had been entered December 31, 1977 (at statutory rate):
1952....	315.65	354.93
1953....	301.87	329.19
1954....	289.56	304.89
1955....	277.30	281.98
1956....	264.29	260.35
1957....	249.57	239.96
1958....	235.61	220.71
1959....	220.70	202.56
1960....	206.22	185.43
1961....	192.58	169.28
1962....	179.66	154.03
1963....	167.62	139.66
1964....	155.92	126.09
1965....	144.57	113.29
1966....	132.18	101.22
1967....	119.41	89.83
1968....	106.00	79.08
1969....	91.87	68.95

Dated: November 30, 1978.

/s/ David F. Anderson
Attorneys for Plaintiffs

/s/ Arthur G. Connolly
Attorney for Defendant

IN THE U.S. DIST. CT. FOR THE DIST. OF DEL.

[Title Omitted in Printing]

[Dated Dec. 5, 1978]

Accounting Pretrial Order

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A523*

AC SPARK PLUG DIVISION

Accused Practice No. 1

The practice of working ferrous metal wherein steel slugs were purchased from Braun Engineering after having been coated with Bonderite 181X phosphate, dipped in an aqueous solution of Parcolene 21, coated with Bonderlube 265 lubricant, and tumbled with molybdenum disulfide powder and then were cold formed from about 1959 through at least 1963 (termination date is in dispute) to form spark plug shell blanks and from about 1962 through at least 1963 (termination date is in dispute) to form aircraft spark plug shield blanks.

Non-Accused Practice A

The practice of working ferrous metal wherein steel slugs were coated with Bonderite 181X phosphate, dipped in an aqueous solution of Parcolene 24, coated with Bonderlube 265 lubricant, and tumbled with molybdenum disulfide powder and then were cold formed prior to 1969 to form spark plug shell blanks and aircraft spark plug shield blanks.

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* Page Nos. refer to CA3 Accounting Appendix Page Nos.

A533

BUICK MOTOR DIVISION

Accused Practice No. 2

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then immersing the metal in an aqueous solution containing Parcolene 21, then coating the metal with Bonderlube 234 then cold forming the metal, said practice being used from about Model Year 1964 through March 1969 to produce piston pins.

Accused Practice No. 3

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then coating the metal with Bonderlube 242-0 and then cold forming the metal, said practice being used from about September, 1966 through March 1969 to produce rear axle shafts.

Non-Accused Practice B

The practice since 1968 or cold forming ferrous metal which comprises cutting steel wire purchased with a lime coating to length to form slugs, and then cold heading the slugs using an oil lubricant during the cold heading operations, to produce gear blanks which were thereafter machined to form gears.

* * *

A545

CADILLAC MOTOR DIVISION — BUMPERS

Accused Practice No. 4

The process of forming automobile bumper parts during the 1959 model year up to approximately May 6, 1959 from flat steel sheets coated with phosphate and Parker Bonderlube 246, 247 or 249 lubricant.

Accused Practice No. 5

The process of forming automobile bumper parts during the 1962 model year and after from flat sheets coated with phosphate and Parker Bonderlube 247, 247A or 249 lubricant.

Accused Practice No. 6

The process of forming automobile bumper parts in 1964 and thereafter from flat steel sheets coated with phosphate and Parker's Bonderlube 201 or 202 lubricant.

Non-Accused Practice C

The process of forming automobile bumper parts after about July, 1968 using steel purchased from J & L coated with Bonderite 114X zinc phosphate and Bonderlube 243.

Non-Accused Practice D

The process of forming automobile bumper parts after about August 1968 using steel purchased from Great Lakes and coated with Bonderite B-880X zinc phosphate and Bruko 27B lubricant by Production Finishing Company.

Non-Accused Practice E

The process of forming automobile bumper parts during the 1959 and 1960 model years from flat steel sheets coated with phosphate and an oil base lubricant.

Non-Accused Practice F

The process of forming automobile bumper parts from 1952 — 1969 from flat steel sheets coated with a wet lubricant over the bare steel.

* * *

A557

CHEVROLET BAY CITY

Accused Practice No. 7

The practice of cold forming steering knuckle parts and other miscellaneous parts from about May 1962 through July 1966 wherein steel wire received from suppliers with a coating of zinc phosphate and a coating of either Bonderlube 235 or Bonderlube 239 lubricant was drawn through a draw die using Ajax No. 5 dry powder drawing compound and then cut into blanks and then the blanks were automatically transferred through a series of progressive cold forming operations with extreme pressure oil being applied to the blanks immediately ahead of each cold forming operation.

Accused Practice No. 8

The practice of cold forming steering knuckle parts and other miscellaneous parts from about July 1966 through March 1969 wherein steel wire was phosphate coated, immersed in an aqueous solution of Parcolene 21 or Stancoat "L", and coated with Bonderlube 234 by suppliers, then shipped to Chevrolet Bay City where the wire was drawn through a draw die using Ajax No. 5 dry powder drawing compound and then cut into blanks and then the blanks were automatically transferred through a series of progressive cold forming operations with extreme pressure oil being applied to the blanks immediately ahead of each cold forming operation.

Non-Accused Practice E

The practice of cold forming steering knuckle parts and other miscellaneous parts prior to March 1969 wherein steel wire was phosphate coated, immersed in an aqueous solution of Parcolene 24 and coated with either Bonderlube 233 or 234 by suppliers, then shipped to Chevrolet Bay City where the wire was drawn through a draw die using Ajax No. 5 dry powder compound and then cut into blanks and then the blanks were automatically transferred through a series of progressive cold forming operations with extreme pressure oil being applied to the blanks immediately ahead of each cold forming operation.

* * *

A553

CHEVROLET DIVISION — BUFFALO PLANT

Accused Practice 9

The practice of cold forming precoated steel that was coated by Republic Steel Corporation and Bethlehem Steel Corporation during the 1959 through 1963 model years to make pitman arm ball stud seats.

* * *

A571

CHEVROLET DETROIT FORGE

Accused Practice No. 10

The practice of cold forming rear wheel spindles from about January 1965 through about June 1965 wherein ferrous metal was coated with phosphate, Kerns 4664 was superimposed over the phosphate, and the coated metal was cold formed.

Accused Practice No. 11

The practice of cold forming Corvair rear wheel spindles from June 1965 through March 1969 wherein ferrous metal was coated with phosphate, and Bonderlube 242 lubricant was superimposed over the phosphate, and the coated metal was cold formed.

* * *

A577

CHEVROLET — LIVONIA

Accused Practice No. 12

The practice of working ferrous metal which comprises forming on the steel blanks a phosphate coating, then coating the metal with Kerns 3833 and then cold forming the metal, said practice being used from about mid-November 1958 through about mid-January 1965 to produce bumpers.

Accused Practice No. 13

The practice of cold forming ferrous metal which comprises forming on that metal a coating of phosphate, then coating the metal with Pennwalt 1047 and then cold forming the metal, said practice being used during 1961 to produce bumpers.

Accused Practice No. 14

The practice of working ferrous metal which comprises forming on the metal a coating of phosphate, rinsing the phosphate coated metal in water and superimposing over the phosphate a lubricant film of either Bonderlube 200 or Bonderlube 200A and thereafter deforming the metal to produce bumper parts, said practice being used from about mid-January 1965 through March 1969.

Non-Accused Practice H

The practice of working ferrous metal which comprises forming on the steel blanks a phosphate coating, then coating the metal with Bonderlube 215 lubricant, and then cold forming the metal, said practice being used from 1954 to mid-November 1958, to produce bumpers.

Non-Accused Practice I

The practice of working ferrous metal which comprises forming on the steel blanks a phosphate coating, then coating the metal with Montgomery DA-2481 or DB-2481 lubricant, and then cold forming the metal, said practice being used during the years 1960 to 1963, to produce bumpers.

A578

Non-Accused Practice J

The practice of working ferrous metal which comprises forming on the steel blanks a phosphate coating, then coating the metal with Bruce's Bruko 27 or 27B lubricant, and then cold forming the metal, said practice being used during 1965 and 1966 to produce bumpers.

* * *

A587

CHEVROLET DIVISION — MUNCIE PLANT

Accused Practice 15

The practice of cold forming transmission main shafts from December 1968 through March 1969 wherein ferrous metal was phosphate coated, immersed in an aqueous solution of Parcolene 24 then coated with Bonderlube 242-W and then cold formed.

* * *

A593

CHEVROLET — PARMA

Accused Practice No. 16

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Kerns PF-4283 phosphate, then coating the metal with Kerns Dry Film 4664, and then cold forming the metal, said practice being used from about July 1963 through March 1969 to produce stator shafts, parking lock and range selector outer levers and output shafts.

Accused Practice No. 17

The practice of making universal joint bearing races and propeller shaft ends from about 1957 through May 1963, wherein ferrous metal was coated with Bonderite 181X, then immersed in water, then immersed in an aqueous solution of Parcolene 21, then dipped in an aqueous solution of Bonderlube 239 and Parker molybdenum disulfide additive No. PTD-1219-B, and then cold formed.

Accused Practice No. 18

The practice of cold forming universal joint bearing races and propeller shaft ends from about May 1963 through May 1964 wherein ferrous metal was coated with Bonderite 181X, immersed in an aqueous solution of Parcolene 21, dipped in a solution of Bonderlube 234 and Parker molybdenum disulfide additive PTD-1219-B, and then cold formed.

Non-Accused Practice K

The practice of cold forming universal joint bearing races and propeller shaft ends from about May 1964 to March 1965 and from March 1966 to October 1968 wherein ferrous metal was coated with Bonderite 181X, immersed in an aqueous solution of Parcolene 24, dipped in a solution of Bonderlube 234 and Parkermolybdenum disulfide additive PTD-1219-B, and then cold formed.

Non-Accused Practice L

The practice of cold forming universal joint bearing races and propeller shaft ends from about February 1965 to February 1966 wherein ferrous metal was coated with Pennwalt Foscoat B-1 zinc phosphate immersed in an aqueous solution of Pennwalt Fosrinse R-1, and dipped in a solution of Pennwalt Foslube L-20 and then cold formed.

* * *

A610

CHEVROLET — SAGINAW

Non-Accused Practice No. M

The manufacture at Chevrolet-Saginaw from 1964 to 1968 of gear blanks for manual transmissions wherein steel blanks were treated with Bonderite 181X zinc phosphate, rinsed in a solution containing Parcolene 24 neutralizer, coated with Bonderlube 234, and then cold formed.

* * *

A620

CHEVROLET — TOLEDO

Accused Practice No. 19

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then immersing the metal in an aqueous solution of Parcolene 21, then coated the metal with Bonderlube 239, and then cold forming the metal, said practice being used from about September 1960 through January 1966 to produce converter hubs.

Accused Practice No. 20

The practice of working ferrous metal in which steel slugs were purchased after being phosphate coated, immersed in water, immersed in an aqueous solution of Parcolene 21 and then coated with Bonderlube 234 and after such purchase the coated slugs were cold formed to produce hub blanks, said practice being used from about February 1966 through March 1969.

* * *

A627

CHEVROLET TONAWANDA FORGE

Accused Practice No. 21

The practice of making tie rod sockets from about June 1963 to about December 1963 wherein ferrous metal was coated with Kerns 4283, then coated with Kerns DF-4800 and/or Drawcote 1050 and then cold formed.

Non-Accused Practice N

The practice of making tie rod sockets from about December 1963 to about mid-1964 wherein ferrous metal was coated with Kerns Dry Film 4800 and Pennsalt Drawcote 1050 in an aqueous mixture and then cold formed.

Non-Accused Practice O

The practice of making tie rod sockets after mid-1964 and at least through March 1969 wherein lime coated steel wire was drawn using Ajax No. 5 draw box compound and thereafter the blanks were cold formed with a flood of extreme pressure chlorinated oil as supplemental lubrication.

* * *

A634

DELCO ELECTRONICS

Accused Process No. 22

The practice of making rocket fuse housings and fuse booster cups from about August 1952 through about February 1954 wherein ferrous metal was coated with Granodraw phosphate, then coated with Montgomery DD-1101 and then cold formed.

* * *

A642

DELCO MORAINE

Accused Practice No. 23

The practice of cold forming DM-6412 steel wire supplied by Republic Steel Company precoated with phosphate and Bonderlube 234 lubricant to make booster studs from late 1964 through June 1968 and to make brake adjuster screw blanks during the 1965 and 1966 model years.

Accused Practice No. 24

The practice of cold forming DM-6412 steel wire supplied by Republic Steel Company precoated with phosphate and Granolube No. 14 lubricant to make booster studs from June 1968 through March 4, 1969.

Non-Accused Practice P

The practice of cold heading SAE-1018 steel wire supplied by various steel company vendors using liquid oil during the period 1952 to 1969 to make brake adjuster screw blanks.

Non-Accused Practice Q

The practice of cold heading SAE-1021 steel wire supplied by various steel company vendors to make brake booster stud blanks prior to late 1964.

A643

Non-Accused Practice R

The practice of cold heading steel wire supplied by Jones & Laughlin Steel Company precoated with phosphate and Bonderlube 233 lubricant to make brake booster stud blanks in 1968 and 1969.

* * *

A658

DELCO PRODUCTS DIVISION

Accused Practice No. 25

The practice of making piston rods, studs, and rings from about June 1962 to about July 1966 wherein ferrous metal was coated with Bonderite 10-X, then coated with a mixture of Parcolene 21 and Bonderlube 235, then drawn down to size using ML-97 (lime and aluminum stearate) at the draw die and then cold formed using oil as additional lubrication during the cold forming operations.

Non-Accused Practice S

The practice of making shock absorber cylinder tubes from 1951 to 1975 wherein the tubes were coated with Granodraw 1 or Granodraw 2 zinc phosphate coating, then coated with Montgomery's DL-691 lubricant and then cold drawn.

Non-Accused Practice T

The practice of making piston rods, studs and rings from about July 1966 to about March 1967 wherein ferrous metal was coated with Bonderite 10-X zinc phosphate, then coated with Bonderlube 232 lubricant, then drawn down to size using ML-97 (lime and aluminum stearate) at the draw die and then cold formed using oil as additional lubrication during the cold forming operations.

A659

Non-Accused Practice U

The practice of making piston rods, studs and rings from about March 1967 to May 1969 wherein ferrous metal was coated with Granodraw 52 zinc phosphate, then coated with Granolube 14 lubricant, then drawn down to size using ML-97 (lime and aluminum stearate) at the draw die and then cold formed using oil as additional lubrication during the cold forming operations.

Non-Accused Practice V

The practice of making shock absorber pistons from February 1968 through March 1969 from steel coil stock precoated by United States Steel with a zinc phosphate coating, then immersed in an unknown aqueous solution and then coated with Bonderlube 234 lubricant and then cutting the steel stock to length and cold extruding the same in a cold header using a liquid lubricant at some of the die stations.

• • •

A671

DELCO REMY DIVISION

Accused Practice No. 26

The practice of making (1) starting motor frames between April 1965 and June, 1966, and (2) starting motor pole shoes between February 1964 and July 1967 wherein ferrous metal was coated with zinc phosphate, then Drawcote 1044 was superimposed on the phosphate coating, then the coated metal was flooded with oil at the press and cold formed.

Accused Practice No. 27

The practice of making (1) Delcotron alternator cores between March 1967 and June 1967, and (2) Delcotron alternator segments between July 1962 and June 1967 wherein ferrous metal was zinc phosphate coated with Granodraw #1, immersed in water or (after March 1967) an aqueous solution of Parcolene 24, then coated with Granolube 10 and then the coated metal was flooded with oil at the press and cold formed.

Accused Practice No. 28

The practice of making (1) starter pinions and (2) one-piece clutch shells from about September 1965 to about November 1966 wherein ferrous metal slugs were coated with zinc phosphate, immersed in water, coated with Granolube 10, then the coated metal was flooded with oil at the press and cold formed.

Accused Practice No. 29

The practice of making

DC Generator Frames between November 1954 and August 1957

Starting Motor Frames between November 1954 and August 1957, June 1966 and March 1969

Starting Motor Pole Shoes between June 1953 and February 1964

DC Generator Pole Shoes between November 1955 and November 1957

Heavy Duty DC Generator Pole Shoes between October 1955 and some time in 1962

Starting Motor Armature Shafts between March 1962 and October 1963

Two-piece Clutch Sleeves between 1955 and September 1960

Two-piece Clutch Shells between some time in 1953 and September 1960

Wherein ferrous metal was zinc phosphate-coated, then immersed in an aqueous solution containing trisodium phosphate, then coated with Montgomery DF-1101, then the coated metal was flooded with oil at the press and cold formed.

Accused Practice No. 30

The practice of making starting motor pole shoes from about February 1964 through about April 1965 wherein ferrous metal was zinc phosphate-coated, then immersed in an aqueous solution of trisodium phosphate, then coated with Drawcote 1044, then flooded with oil at the press and cold formed.

Accused Practice No. 31

The practice of making starting motor shafts from about October 1963 to about January 1965 wherein ferrous metal was coated with zinc phosphate, then immersed in an aqueous solution of trisodium phosphate, then coated with Granolube 10, then flooded with oil at the press, then cold formed.

Non-Accused Practice W

The practice of making (1) Delcotron alternator cores after June 1967 and (2) Delcotron alternator segments after June 1967, wherein ferrous metal was zinc phosphate-coated with Granodraw #1, immersed in an aqueous solution of Parcolene 24, then coated with Granolube 14 and then the coated metal was flooded with oil at the press and cold formed.

Non-Accused Practice X

The practice of making (1) starter pinions, and (2) one-piece clutch shells after November 1966 wherein ferrous metal slugs were coated with zinc phosphate, immersed in an aqueous solution of Parcolene 24, coated with Bonderlube 234; then the coated metal was flooded with oil at the press and cold formed.

Non-Accused Practice Y

The practice of making

DC Generator Frames from 1951 through November 1954 and after August 1957

Starting Motor frames from 1953 through November 1954 and between August 1957 and April 1965

Starting Motor Pole Shoes after July 1967

DC Generator Pole Shoes after November 1957

Heavy Duty DC Generator Pole Shoes after 1962

Two-piece Clutch Shells after September 1960

Clutch Sleeves after September 1960

Delcotron alternator cores from 1962 through March 1967

wherein ferrous metal was zinc phosphate-coated, then immersed in water, then coated with Montgomery DF-1101, flooded with oil at the press, and then cold formed.

Non-Accused Practice Z

The practice of making starting motor armature shafts after January 1965 wherein ferrous metal was zinc phosphate-coated, then immersed in either an aqueous solution of trisodium phosphate (through March 1967) or water (after March 1967), then coated with liquid sulphurized extrusion oil, Extrudol 51-0, then cold formed.

* * *

A698

DETROIT DIESEL ALLISON DIVISION

Non-Accused Practice AA

The manufacture, from approximately January 1954 through March 4, 1969 of main and connecting rod bearing shells by cold forming steel coated with zinc phosphate and Montgomery DU-1101 or DT-1101 lubricant.

* * *

DIESEL EQUIPMENT DIVISION

The Prior Trial Hydraulic Valve Lifter Plunger Practice

The practice of making hydraulic valve lifter plungers from about 1955 through the third quarter of 1958 wherein the ferrous metal was coated with phosphate. rinsed in Parcolene 21, coated with Bonderlube 235, and then cold formed. This practice was in evidence before the Courts during the infringement trial and appeal therefrom.

Accused Practice No. 32

The practice of making disc brake housing retaining bolts from about October 1968 through March 1969 wherein steel wire was coated with phosphate, immersed in an aqueous solution of Stancoat L and coated with Bonderlube 234 and then drawn through a draw die using a dry powder combination of lime and calcium stearate at the draw box and then cold formed at successive stations of a cold forming machine using a liquid oil compound containing sulfur and chlorine at each station.

* * *

FISHER BODY — COLUMBUS

Accused Practice No. 33

The practice of cold forming window regulator bearing studs and door lock striker pins during the period of 1963 to January 1964 using steel which had been phosphate coated, then immersed in an aqueous solution of Stancoat L, then coated with Bonderlube 235 by Republic Steel.

Accused Practice No. 34

The practice of cold forming window regulator bearing studs during the period January 1964 to November 1966 using steel which had been phosphate coated, then immersed in an aqueous solution of Stancoat L, then coated with Bonderlube 234 by Republic Steel.

Accused Practice No. 35

The practice of cold forming door lock striker pins during the period January 1964 to March 1969 using steel which had been phosphate coated, then immersed in an aqueous solution of Stancoat L, then coated with Bonderlube 234 by Republic Steel.

A712

Non-Accused Practice BB

The practice of cold forming window regulator bearing studs from November 1966 to August 1971 using steel that had been phosphate coated then immersed in an aqueous solution of Parcolene 24 then coated with Bonderlube 233 by Republic Steel.

Non-Accused Practice CC

The practice of cold forming window regulator bearing studs after August 1971 from steel that had been phosphate coated and then lime coated by Republic Steel.

Non-Accused Practice DD

The practice of cold forming rivets from 1963 through March 1969 using steel supplied by Republic Steel Company, which had been precoated with phosphate and grease.

* * *

A729

FISHER BODY DIVSION — ELYRIA

Accused Practice No. 36

The manufacture of bumper parts from April 1957 through March 1960 involving the step of cold forming zinc phosphated steel coated with Bruko D-122, Kerns DF-4800, or Pennwalt Drawcote 1044 lubricant.

* * *

A738

INLAND DIVISION

Accused Practice No. 37

The practice of making ball joint sockets from about 1959 through March 1963 wherein steel which had been precoated with Bonderlube 235 over phosphate was cold formed.

Accused Practice No. 38

The practice of making ball joint sockets from about March 1963 through June 1966 wherein ferrous metal was coated with Bonderite 181X zinc phosphate immersed in an aqueous solution of Parcolene 21, coated with Bonderlube 239, and then cold formed.

Accused Practice No. 39

The practice of making brake hose fittings beginning about 1964 using precoated steel wire purchased from Republic Steel Corporation wherein the wire which was coated with Bonderlube 181X zinc phosphate, immersed in an aqueous solution of Parcolene 21, and coated with Bonderlube 234 lubricant was cold formed.

A739

Non-Accused Practice EE

The practice for making ball joint sockets since June 1966 wherein ferrous metal is coated with Bonderite 181X zinc phosphate, rinsed in water, coated with Bonderlube 234, and then cold formed.

Non-Accused Practice FF

The practice of making brake hose fittings from about 1965 wherein the precoated steel wire was purchased from Jones and Laughlin Steel Company coated with zinc phosphate and Bonderlube 233.

Non-Accused Practice GG

The practice of making brake hose fittings in 1967 wherein the precoated steel wire was purchased from Youngstown Sheet and Tube Company and was coated with a heavy lime coating only.

* * *

A753

NEW DEPARTURE — HYATT

Accused Practice No. 40

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then immersing said metal in an aqueous solution of Parcolene 21, then coating said metal with Bonderlube 239, then cold forming said metal, said practice being used from Model Year 1958 until about November 1957 to produce bearings.

Accused Practice No. 41

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then immersing said metal in an aqueous solution of Parcolene 21, then coating said metal with Bonderlube 235 and then cold forming said metal, said practice being used from about November 1957 to about June 1963 to produce bearings, and from about January 1958 through 1962 to produce outer rings.

Non-Accused Practice HH

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then rinsing the metal with water, then coating said metal with Bonderlube 234, then cold forming said metal, said practice being used after about June 1963 to produce bearings.

* * *

A762

OLDSMOBILE DIVISION

Accused Practice No. 42

The practice of forming ogives and body parts from approximately June 1953 to about January 1954 in which ferrous metal was coated with phosphate, then coated with Industrial Lubricant 715 and then cold formed.

Accused Practice No. 43

The practice of working ferrous metal from January 1962 through the 1963 model year wherein Precision Metal Finishing on behalf of Jones and Laughlin Steel Corporation coated the metal with phosphate, then immersed it in an aqueous solution of Montgomery MA-88, then superimposed over the phosphate a lubricant film of Montgomery DA-2481 and then shipped the metal to the Oldsmobile Division where it was cold formed.

Accused Practice No. 44

The practice of making axle shafts and drive pinions from about 1964 to about May 1966 wherein ferrous metal was coated with phosphate, then coated with Kerns WF-4800 and then cold formed.

A763

Accused Practice No. 45

The practice of making axle shafts and drive pinions from about May 1966 through March 1969 wherein ferrous metal was coated with phosphate, then coated with Bonderlube 242-0 and then cold formed.

Accused Practice No. 46

The practice of working ferrous metal from about September 1963 through March 1969 wherein Jones and Laughlin Steel Corporation coated the metal with phosphate, then superimposed thereon a lubricant film of Montgomery DA-2481 and then shipped the metal to the Oldsmobile Division where it was cold formed.

Non-Accused Practice No. II

The practice of cold forming rocket ogives from about December 1951 to June 1953 in which ferrous metal was coated with zinc phosphate, then coated with H.A. Montgomery's DQ-593 and then cold formed.

Non-Accused Practice No. JJ

The practice of cold forming rocket body parts from approximately November 1952 to June 1953 in which ferrous metal was coated with zinc phosphate, then coated with H.A. Montgomery's DQ-593 and then cold formed.

A764

Non-Accused Practice No. KK

The practice of cold forming bumpers from December 1949 to November 1953 in which ferrous metal was coated with zinc phosphate, then coated with H.A. Montgomery's DQ-593 (or Bruce Products D-48 in 1953 only) and then cold formed.

Non-Accused Practice No. LL

The practice of cold forming bumpers from November 1953 to December 1958 in which ferrous metal was coated with zinc phosphate, then coated with zinc phosphate, then coated with DC-1471 and then cold formed.

Non-Accused Practice No. MM

The practice of cold forming bumpers from December 1958 to May 1959 in which ferrous metal was coated with zinc phosphate, then coated with DX-1101 and then cold formed.

Non-Accused Practice No. NN

The practice of cold forming bumpers from May 1959 through 1965 Model Year in which ferrous metal was coated at Oldsmobile with zinc phosphate, then coated with DA-2481 and then cold formed.

* * *

A801

PONTIAC DIVISION

The Prior Trial Pontiac Bumper Forming Practice

The practice of working ferrous metal in which steel blanks were phosphate coated, immersed in an aqueous solution of Parcolene 21, coated with a film of Bonderlube 246, and thereafter the steel blanks were deformed to form bumper parts, said practice being used from about December 1955 to about December 1958. This practice was in evidence before the Courts during the infringement trial and the appeal therefrom.

The Prior Trial Pontiac Rocket Forming Practice

The practice of making rocket bodies and rocket heads used in 1952 and 1953 wherein ferrous metal was coated with phosphate, immersed in an aqueous solution of Parcolene 20, coated with Bonderlube 235 and cold formed. This practice was in evidence before the Courts during the infringement trial and the appeal therefrom.

Accused Practice No. 47

The practice of making rocket bodies and rocket heads, used in 1954 wherein ferrous metal was coated with phosphate, immersed in an aqueous solution of Parcolene 20, coated with Bonderlube 239, and cold formed.

Accused Practice No. 48

The practice of making bomb type bumper guards during the year 1955 wherein ferrous metal was coated with phosphate and then coated with Bonderlube 246 by Production Finishing Corporation, shipped to Pontiac Division and there cold formed.

Accused Practice No. 49

The practice of working ferrous metal in which steel blanks were phosphate coated, immersed in an aqueous solution of Parcolene 21, then coated with a film of Bonderlube 246, then had tallow, a drawing compound, or Molykote, applied over the Bonderlube 246 and thereafter the blanks were deformed to make bumper parts, said practice being used to make bumper parts during the period from about December 1955 to about March 1959.

Accused Practice No. 50

The practice of making bumpers during the period from about 1966 through about July 1968 wherein ferrous metal was coated with phosphate and then coated with Bonderlube 200 or Bonderlube 200A by Production Finishing Corporation, shipped to Pontiac Division and there cold formed.

Accused Practice No. 51

The practice of working ferrous metal which comprise forming on the metal a phosphate coating and superimposing thereon a dry film of Bonderlube PTD 1239A

A803

or Bonderlube 249A and thereafter deforming the metal, said practice being used from about December 16, 1958 through about March 4, 1959 and from about March 4, 1959 to about September 16, 1963, respectively, to make bumpers.

Accused Practice No. 52

The practice of working ferrous metal which comprise forming on the metal a phosphate coating and superimposing thereon a dry film of Bonderlube 200A or Bonderlube 200 and thereafter deforming the metal, said practice being used from about September 16, 1963 through about November 9, 1964 and from about November 9, 1964 through about the 1966 model year, respectively, to make bumpers and bumper parts.

Accused Practice No. 53

The practice of working ferrous metal wherein the Jones and Laughlin Steel Corporation at Pittsburgh, from 1965 model year through July 15, 1968 formed on the surface of its ferrous metal a phosphate coating and superimposed a lubricant film of Bonderlube 200 or Bonderlube 201 or Bonderlube 202 and thereafter the Pontiac Motor Division deformed the coated ferrous metal to make bumper parts.

A804

Non-Accused Practice OO

The practice of forming automobile bumpers after about July 1968 using steel purchased from Jones and Laughlin coated with Parker Bonderite 114X zinc phosphate and Bonderlube 243.

Non-Accused Practice PP

The practice of forming automobile bumpers after about August 1968 using steel purchased from Great Lakes and coated with Parker Bonderite 114X zinc phosphate and Bruko 27B lubricant by Production Finishing Company.

Non-Accused Practice QQ

The practice of forming automobile bumpers from 1952 through the 1955 model year using Montgomery's Mar-proof or Bruce No-Mar applied over bare steel and applying wet lubricant thereover.

* * *

A819

SAGINAW STEERING GEAR

Accused Practice 54

The practice of working ferrous metal prior to March 1967 wherein purchased coiled steel wire having a surface on which a phosphate coating had been formed by the supplier is coated with an aqueous solution of Pennsalt Drawcote 1044 containing soap and borax, drawn through a die using Ajax No. 5 drawing compound, flooded with extreme pressure oil, and thereafter cold formed, primarily to make ball joint studs.

Accused Practice 55

The practice of working ferrous metal wherein coiled steel wire was treated with an aqueous solution of Parker Bonderite 181X, immersed in water, immersed in an aqueous solution of Parker Parcolene 21, coated with an aqueous solution of Parker Bonderlube 234, drawn through a die with Ajax No. 5 drawing compound, flooded with extreme pressure oil and thereafter deformed to make ball joint studs, from March 1967 through March 1969.

Accused Practice 56

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then immersing the metal in an aqueous solution of Parcolene 21, then coating the metal with Bonderlude 239 and then cold forming the metal. This practice was used from Model Year 1961 until about September 1962 to produce pot couplings, from Model Year 1961 until about September 1962 to produce upper and lower ball joint housings, from Model Year 1958 until about September 1962 to produce universal joint bearing races, from Model Year 1960 until about September 1962 to produce linkage booster valve body bearing sleeves, and from January 1961 through September 1962 to make rotary valve gear worm shafts and from Model Year 1961 through September 1962 to make lower control arm shaft No. 577926.

Accused Practice 57

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X then immersing the metal in an aqueous solution of Parcolene 21, then coating the metal with Bonderlube 234 and then cold forming the metal. This practice was used from September 1962 through March 1969 to produce pot couplings; from September 1962 through March 1969 to produce universal joint bearings; from September 1962 through March 1969 to produce upper and lower ball joint housings; from September 1962 through March 1969 to produce rotary valve gear worm shafts; from Model Year 1964 through March 1969 to produce manual steering gear worm shafts from September 1962 through March 1969 to produce linkage booster valve body bearing sleeves; from Model Year 1964 through March 1969 to produce upper control arm shafts; from September 1962 through Model Year 1963 to produce lower control shaft No. 577926; from Model Year 1967 through March 1969 to produce solid and tubular steering shafts;

A821

and from Model Year 1966 through March 1969 to produce drive axle outer race blanks.

Accused Practice 58

The practice of making air pump rotors from Model Year 1968 through March 1969 wherein ferrous metal was coated with Bonderite 181X, then immersed in an aqueous solution of Parcolene 21, then coated with Bonderlube 234, then coated with molybdenum disulfide and then cold formed.

Non-Accused Practice RR

The practice of working ferrous metal prior to March 1967 wherein purchased coiled steel wire having a surface on which a phosphate coating had been formed by the supplier is drawn through a die using Ajax No. 5 drawing compound, flooded with extreme pressure oil, and thereafter cold formed, primarily to make ball joint studs.

Non-Accused Practice SS

The practice of working ferrous metal prior to March 1967 wherein purchased coiled steel wire having a surface on which a lime coating had been formed by the supplier is coated with an aqueous solution of Pennsalt Drawcote 1044 containing soap and borax, drawn through a die using Ajax No. 5 drawing compound, flooded with extreme pressure oil, and thereafter cold formed to make products other than ball joint studs.

* * *

IN THE U.S. DIST. CT. FOR THE DIST. OF DEL.

[Title Omitted in Printing]

[Dated December 5, 1978]

EXCERPT FROM ACCOUNTING PRETRIAL ORDER STATEMENT ON DELCO REMY ACCOUNTING PRETRIAL ORDER

* * *

A677

DC Generator Field Frames

Prior to 1951 the frame of the DC Generator, was made from plate stock cut to the proper length and wrapped into a cylindrical shape through a series of press forming operations. Thereafter the seam was welded, the inside diameter was bored to the proper size and each end was faced. The finished frame made by this process is shown in Figure 3 on the next page.

In October 1951, a new procedure for cold forming DC generator frames was adopted. Under this method, flat steel plates which had been cut to size were wrapped into cylinders. The cylinders were then phosphate and lubricant coated as follows:

1. Each cylinder was immersed in an aqueous solution of Granodraw #1 phosphating material at 170°-180°F. for 3-5 minutes thus forming on the cylinder's steel surface a phosphate coating;

2. Then the phosphate-coated cylinder was either immersed in water or an aqueous solution of trisodium phosphate each for 1-2 minutes at 180°-200°F. The trisodium phosphate solution was used from November 1954 to August 1957 only and was at pH8.

3. Thereafter the cylinders were immersed in an aqueous solution of Montgomery DF-1101 at 190°-200°F. for 3-5 minutes after which they were air dried.

The coated cylinders were then cold formed in a press while being flooded with extrusion oil. Cold forming of the cylinders which were immersed in the trisodium phosphate solution in step 2 above is accused practice 29. Cold forming of cylinders which were immersed in water in step 2 above in non-accused practice Y.

A678

Figure 3

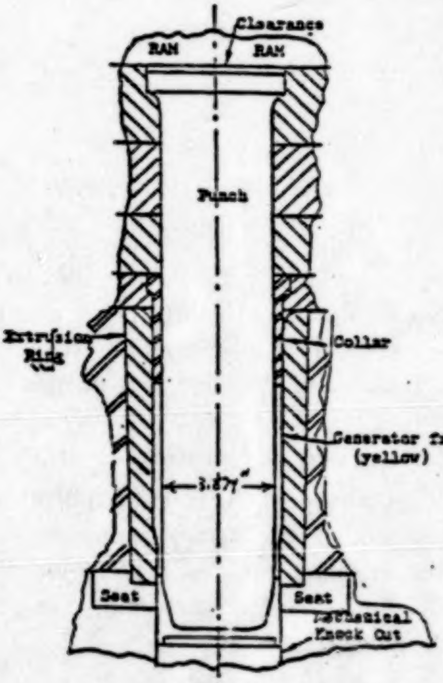
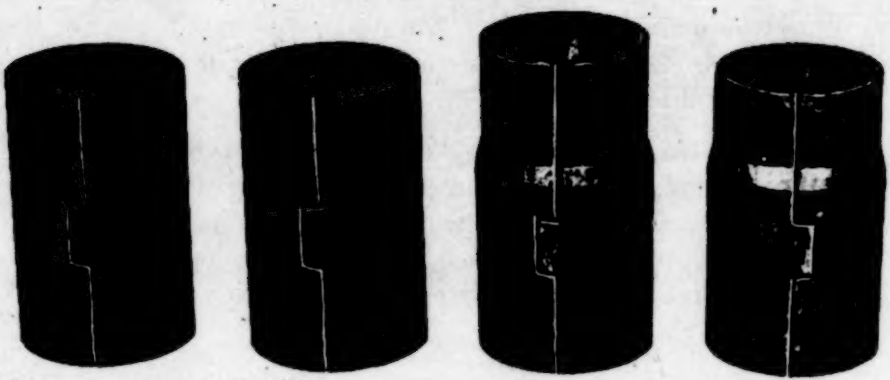


Figure 5

Extrusion Operation for Generator Frame



Wrapped Blank
Step No. 1 | Same — Phosphate and Lubricant Coated
Step No. 2 | Same — After Cold Forming
Step No. 3 | Completed Frame With End Trimmed
Step No. 4

Figure 4 — Steps in Extrusion of Generator Frame

A679

The steps used in making the generator frame after 1951 are shown in Figure 4. The cold forming of the frames was done by flooding the phosphate and lubricant coated cylinder with extrusion oil and axially driving it against an extrusion ring (also called a die) as shown in Figure 5.

Starting Motor Frames

The frame for the starting motor, as first made in 1953, was produced in the same manner as the DC generator frame. Pre-cut flat steel plates were wrapped into cylinders. The cylinders were then phosphate and lubricant coated using the following steps:

1. The cylinders were immersed in an aqueous solution of Granodraw phosphating material at 160°-

180 °F. for 3-5 minutes thus forming on the surface of the steel cylinders a phosphate coating;

2. Then the phosphate-coated cylinder was either immersed in water or in an aqueous solution of trisodium phosphate. The trisodium phosphate was used from November 1954 to August 1957, and from August 1967 through March 1969, and was at pH8.

3. Then immersed in an aqueous solution of Montgomery DF 1101 or Drawcoat 1044 (used only from April 1965 to January 1967) both at .9-1 pound/gal) at 180 °-200 °F. for 3 minutes after which they were air dried.

The coated cylinders were then cold formed in a press while being flooded with extrusion oil.

A680

Cold forming of cylinders immersed in the trisodium phosphate solution and coated with Montgomery DF-1101 is accused practice 29. Cold forming of cylinders immersed in water and coated with Drawcoat 1044 is accused practice 26. Cold forming cylinders immersed in water and coated with Montgomery DF-1101 is non-accused practice Y.

* * *

IN THE U.S. DIST. COURT FOR THE DIST. OF DEL. [ACCOUNTING TRIAL TESTIMONY]

OTHMER-DIRECT

[755]* BY MR. McCOY:

Q Would you turn to Plaintiffs' Exhibit A-66, Dr. Othmer, and Plaintiffs' Exhibit A-2-b?

A Yes.

Q And first, in Plaintiffs' Exhibit A-2-b, you see the heading, "The Prior Trial Pontiac Rocket Forming Practice."

A Yes.

Q Would you please relate that practice to the claim breakdown in Group B, going down the elements?

A Here we have again soap and borax, and at least 3 to 15 percent of the lubricant is borax, and at least 2 percent of the lubricant is sodium nitrite.

Here again, borax is listed as a pigment, to use the terminology of the patent. And sodium nitrite comes within that same terminology. Soap is the solid meltable organic material. And as in this exhibit, the borax is shown with its chemical composition, and the sodium nitrite with its chemical formula in the right as listed as being present in the accused practice.

* * *

[757] Q With respect to the claim requirements in Plaintiffs' Exhibit A-66, do all of those practices relate to a process of working ferrous metal?

A They do.

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* Accounting trial transcript page.

Q And in all of those accused practices, is a phosphate coating formed on the metal?

A It is.

Q As a fixed film superimposed on top of the phosphate coating?

A It is.

Q Does that film contain a solid meltable organic binding material?

A It does, which is listed as soap.

Q And does it contain a solid inorganic compound?

A In this case it contains two that are so classified, the borax and the sodium nitrite.

Q And are those compounds meltable at a temperature below the melting point of the ferrous metal [758] phosphate of the coating?

A Respectively, the borax is 75 degrees C., and the sodium nitrite is 271 degrees C.

Q What is the answer to my question?

A The answer is that the claim requirements — the claim covers the practices as specified.

Q Is the melting point of both the sodium nitrite and the borax below the melting point of the ferrous metal phosphate of the coating?

A Those respective melting points are.

Q You have testified about the Mohs hardness of the borax; right?

A Yes.

Q Do you know the Mohs hardness of the sodium nitrite?

A That is tabulated in that same general range of 2 to 2.5.

Q In all of these accused practices, is the metal deformed after this coating has been applied?

A That is the purpose, yes, and that is what is done.

* * *

IN THE U.S. DIST. CT. FOR DIST. OF DEL.

[Accounting Trial Testimony]

HENRICKS — DIRECT

* * *

[3692]* Q. I do want to ask you whether these cover all the tests that you, yourself, made or had made on production metal-forming processes by the end of 1952 using soap and borax over an integral coating?

A. Other than the test that Walter Pinner made at Houdaille which I was not a party to, but they reported back it worked. I sent him a sample of that lubricant to use.

Q. That is as you testified last Thursday?

A. Yes. Those are the only ones I recall.

Q. None of these tests involved plating, did they?

A. No, sir. This was all tube stock or, yes, in that case of Briggs it was drawing stock.

Q. There is no question, is there, that if phosphate is used in an integral caoting, it must be removed before you can plate?

A. Yes, sir.

Q. That is a correct statement?

A. Correct.

Q. And as a practical matter, removing the phosphate requires an acid dip?

A. The normal stripping we used to use was strong caustic to get the weight of the coating.

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* Accounting trial transcript page.

[3693] When I developed the calcium-modified bath, it didn't come off in strong caustic. We switched to chromic acid.

Q. Let me just try again, Mr. Henricks. Let's think in terms of what is necessary to use in industry where we have phosphate-coated steel and subsequently plate. Now, it is common to use strong alkaline cleaners; isn't that right?

A. Yes, sir.

Q. Isn't it also necessary to use an acid dip in addition to the strong alkaline cleaner?

A. Yes, sir. That is standard practice in all plating lines.

Q. It is also at least desirable to use an electrocleaning type of step, too?

A. Yes, sir.

Q. Is that necessary or just desirable?

A. I would say from experience on nickel plating that it is essential. I know of no production line that eliminates the electrolytic cleaner.

Q. And all this cleaning is necessary regardless of the lubricant applied over the phosphate?

A. Yes, sir. That is even plain steel that they go through that cycle of soap clean, electroclean, [3693A] acid dip.

* * *

[3724] Q Incidentally, the strong acids that are necessary to remove the phosphate will also remove zinc stearate, will they not?

A I haven't done much work with acid cleaners over that German process. Theoretically, if you undercut the zinc stearate by dissolving the phosphate, it would float up like an oil slick. In time you would probably regenerate, if it was sulfuric acid, zinc sulfate; but you would still leave an oil slick of stearic acid. It wouldn't dissolve as such. You would have to have strong caustic and form sodium zincate and sodium stearate to truly dissolve it.

Q So if I used strong caustic in removing my phosphate, then I would remove the zinc stearate with it?

A You would remove zinc stearate with a strong [3725] caustic better than you would with an acid, I believe.

Q And if I did use a strong caustic, I in fact would remove zinc stearate, would I not?

A I think eventually that solution would saponify it again. It is not instantaneous, though. It is so insoluble, it would probably float up. It is lighter than water.

Q And float up off the work in that respect, we would now have our work cleaned of both the phosphate and the zinc stearate?

A Yes, sir.

* * *

IN THE U.S. DISTRICT COURT
FOR THE DISTRICT OF DELAWARE
[ACCOUNTING TRIAL TESTIMONY]

Shortt — direct

* * *

[2299]* BY MR. BENDER:

Q Mr. Stargatt, I would like to next mark in evidence the bumpers which we've been advised are made by the same process which we observed during our inspection in July of 1978 wherein one line was being run with soap and borax and another line was being run with soap alone. And, as I understood the situation, this was being done in the regular course of business at the time of our inspection and was not being set up for our purposes only, but was just a regular course of conduct of General Motors-Chevrolet operation, and that the samples that we've been provided with were run at a later date but also in the regular course of business on a line which had soap and borax on one and which had plain soap on another, and which accords with the production lines on the date that we inspected in July of 1978.

MR. FROST: I think I'll have to give just an explanation of what has been done. At the time the inspection — and I believe it was July — was arranged, I asked Chevrolet to use some of the soap only lubricant that it had left over in connection with its prior use of some soap only [2300] for the same soap only lubricant on part of its bumper production so that it would be possible for the plaintiffs to see both soap and soap and borax production. At that time no samples were taken. And at that time the so-called commercial bumper was the one that was made with soap only, again at my request. And the passenger car bumper, what we call the B body bumper, was being made with the soap and borax.

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* Accounting trial transcript page.

THE MASTER: I'm sorry. My mind was wandering for a second. When plaintiffs got there there were two lines operating one with soap and one with soap and borax? Or am I wrong?

MR. FROST: I was not there myself personally. I believe they had more than two lines operating. There are a total of five coating lines. One of them at least was operating with soap only. That line was the rework line which reworks steel, flat polished steel that has defects in it, and that could have been making any of the bumper stock for any of the bumpers. It happened to be at that time, though, making the stock for the so-called commercial bumper.

THE MASTER: And was that a special arrangement that was made for plaintiffs or was that the regular course of business?

MR. FROST: No. At that particular time Livonia [2301] had been operating immediately previously 100 percent on soap and borax. A year or so earlier they had the soap only that they had been using, and they had some left over of that soap, and that's what they used.

THE MASTER: I'm not sure that Mr. Bender fully explained that to me.

MR. BENDER: That's because this is the first time I've ever heard this. This is the first time we've ever heard this explanation, and we've had discussions of it on numerous occasions, even in the pretrial conference before yourself when the question came up of getting samples.

MR. FROST: Yes.

MR. BENDER: And even when we were permitted to inspect, no explanation was given to us like this. So this is the first time I've heard this in terms of an explanation. We were told that that line was running soap and borax and this particular line was running soap, and we observed them as such.

THE MASTER: That rings a familiar chord with me, Mr. Frost. I didn't participate in any detailed discussions on the issue, but I do recall the subject having been discussed at one of our conferences where the question was raised as to the furnishing of actual production bumpers.

MR. FROST: Oh, yes.

[2302] THE MASTER: And I remember it because it seemed to me like it was a big expense to go through. And you yourself were somewhat quizzical as to how easily or how much difficulty would be involved in getting it done. And I do remember the references to some bumpers being produced by soap and some by soap and borax, but do not remember getting any impression that it was out of the regular course of Chevy's business to be producing it by soap.

MR. FROST: Let me try again on it, if I may. Maybe the easiest way for me to do it is just turn to our Livonia exhibit which gives a list of the lubricants that Chevy was using. I think that will explain it.

In Defendant's Exhibit A-33, Item 49, is a tabulation of the Chevrolet bumper usage, and in the years 1973, 1974, 1975 and 1976 they used Bonderlube 243 soap only lubricant in one year essentially half and in other years less than half of their production.

Now, they did not use the 243 in 1977, nor did they use it in 1978 prior to the event of this inspection. And when the request for the inspection came in, I asked that they use some of the soap only so that it would be available for plaintiffs. Now, it was used on regular bumpers which were sold and processed by the plant in the regular way. And our purpose was to show the plaintiffs [2303] both types of lubricants. And we told them that. And they were at liberty to see either or both.

Now, following that event came the question of supplying additional samples. I do not recall whether they were continuing at that time to use this Bonderlube 243. I knew they had a limited supply of it and I knew that they would either run or were going to run out. So when the question came up of supplying the bumper samples, we just had to ask that they do it, and they did buy more. And at the present time out of the two of the five coating lines they're presently operating, two of them with soap only, this Bonderlube 243, and the balance with the soap and borax. And that has been true since, I believe, August sometime when they commenced doing that.

Now, that's the story, and we will have a witness that will have the data in exact details.

MR. BENDER: May I say this, Mr. Stargatt? I don't want to dwell on this subject, but I think it is important to bring it to the surface because of things that have transpired since we made our inspection and since in fact one of their expert witnesses inspected the Chevy-Livonia line. And I would like to say first of all that we never requested as such to see a plain soap operation at Chevy-Livonia. There was no such request. When we got there, we [2304] were told that there was one line running with soap and there was one line running with soap and borax, did we want to see both of them. We said, well, under those circumstances, yes.

As to the statistics that Mr. Frost alluded to, which showed Bonderlube 243, at that same time that that was being run it's noteworthy that the soap and borax was likewise being run. In fact, in 1976 when they were utilizing Bonderlube 243 to the extent of 23,000 pounds, they were utilizing soap and borax to the extent of 90,000 pounds. And then in 1977 they were utilizing soap and borax entirely and in 1978, up through July, according to this exhibit, they were utilizing soap and borax entirely.

Now, the reason I make a point of this is that in some respects, in many respects, that exhibit is very helpful to us because it shows that they switch back to soap and borax in its entirety. But I think there is another issue and it comes about on the issue of, I would say, more of a credibility nature in the following respect: That during the deposition of Mr. Pelton, one of the defendant's reasonably royalty experts, he was asked the question of when he visited the plant, since his main reliance was that soap and borax was supposed to be cheaper, whether he didn't ask them why they were using plain soap when soap and borax was suppo)sed to be cheaper, and he said he did ask a question like that and he [2305] got, I believe the words he used was, a confused answer. And the thing about this is that our having seen the plain soap operation being run at the same time as the soap and borax operation, one immediately asks one's self if soap and borax is cheaper, why would Chevrolet-Livonia be even using plain soap which is totally inconsistent with the position that's being taken. And that's why I have thrown this in in terms of a sequence of events and to why I'm saying, because in fact it's a fact, that is the first time that we've heard this statement about the request being made by Mr. Frost of Chevy-Livonia that they use the same soap that they had left over from, I guess it was, 1976.

MR. ZIESENHEIM: The only thing I can think of in addition, Mr. Stargatt, since Mr. Bender was not there, was that we were advised —

MR. BENDER: I was there, but you were advised personally.

MR. ZIESENHEIM: We were advised that it was also because of their desire for two sources of supply that they ran — were operating with soap in one case and soap and borax.

MR. FROST: May I be heard?

THE MASTER: Yes.

MR. FROST: I think there are several things on this. First, we will have witnesses here that can talk about [2306] this, and the two sources of supply is absolutely correct. And as to prices, the oddity is that in the very most recent occasion, why the prices were actully cheaper for the soap than for the soap and borax. And that's because of changes in market conditions, plus leap-frogging in price increases with different suppliers. That's an artifact in the case. It really has nothing else to do with it.

THE MASTER: All right. Well, I think that the arguments made with respect to the soap and soap and borax uses or parallel uses are better left where they more snugly fit in the proceedings. I do think it's regrettable to the extent that soap operation was introduced for the benefit of plaintiffs' visit, that they weren't told about it since it's obvious that the inspection they arranged was to see the operation of the Chevrolet plant as it was operating on the day they were there. And if a show was being put on for them with respect to what had been used previously, it may be that they ought to have been told about it. But that's a comment rather than anything that's directly before us. And I think we ought to go on to our case.

Mr. Bender, you were in the process of explaining, when Mr. Frost amplified the facts, what it is you propose to be offering. Can you get back on that track again?

* * *

[2329] [THE MASTER]*** Are you trying to establish that there were no opinions from outside counsel produced pursuant to Rule 33(c) in response to Answer to Interrogatory 21?

MR. BENDER: Yes, sir. If we could have a concession from General Motors on that —

MR FROST: Certainly. There are no such opinions.

THE MASTER: All right.

MR. BENDER: And the same would apply to the next interrogatory, which was subsequent to July 12, 1963?

THE MASTER: Mr. Frost?

MR. FROST: There are no such written opinions. We did have Mr. Hibben's opinion. I guess that's not the point here now.

MR. BENDER: Well, we are looking for written opinions.

THE MASTER: You've made your record on this point.

MR. BENDER: Yes, sir.

THE MASTER: So that's both 21 and 22 that have been responded to in this way?

MR. BENDER: That's correct, sir.

* * *

IN THE U.S. DISTRICT COURT FOR THE DISTRICT OF DELAWARE [ACCOUNTING TRIAL TESTIMONY]

Lawson — direct

[3173]* Q. I would like now to turn to a little different subject, Mr. Lawson. I would like to return to Defendant's Exhibit A-33. You have a copy, Mr. Lawson?

A. I do.

Q. I believe you have testified, Mr. Lawson, that there was a period when you worked in the Standards Department?

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* Accounting trial transcript page.

A. That's correct.

Q. During that period did you have occasion to work with labor routings?

A. I did.

[3173]* Q. Did you at my request examine labor routings with respect to the bumper bearing the number 3744766, which is identified as item 27 in Defendant's Exhibit A-33?

A. I did.

Q. Can you first describe for us what the legend part No. 3744766 signifies, Mr. Lawson?

A. The part number signifies a front commercial bumper that we produced in 1957. This is a commercial front bumper routing.

Q. Did that production continue for a period [3174] of time?

A. This bumper was basically a carryover bumper from then through '67.

Q. Are you familiar with the bumper construction itself?

A. Oh, yes.

Q. Can you advise us as to that bumper design in relation to the '59 passenger car bumper that is current which we have before us here in terms of the difficulty of forming?

A. I would say all three of those are very generally the same style and configuration. They have many of the same characteristics.

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* Accounting trial transcript page

MR. BENDER: Excuse me. Just as a matter of definiteness, you were pointing to some bumpers here and I don't know which you were talking about. Were you talking about this B bumper or were you talking about the commercial one when you were comparing it just now?

MR. FROST: I thought I asked very clearly commercial.

BY MR. FROST:

Q. But, for the sake of the record, Mr. Lawson, the bumper on your left in front of you here is identified as Plaintiffs' Exhibit A-236-3-3. [3175] I ask you if that is the bumper you were referring to in your recent testimony?

A. That is correct. I was referring to the commercial front bumper as shown there and also the one as talked about on the routing.

Q. And the routing is item 27 of Exhibit A-33; is that correct?

A. That's correct.

Q. Let's just spend a brief moment on this routing. I would like to get, if I may, Mr. Lawson, your testimony as to what the various figures are. I would like to start with the date at the left-hand corner. What does that signify?

A. That was the issuance of the routing, September 1, 1957. And reading right across, that indicates that that was the first issue.

Q. When you say "issue," is there some significance to that term?

A. Yes. This would be the original routing, showing hours for this specific part.

Q. What is the labor routing used for?

A. Our labor routings are used to show the sequence of operations on the left-hand side. It also shows the material that is used, the weight of the [3176] material; and if you will note on the left-hand side, you will see up in the upper left-hand corner Seq. number. That is the sequence number. Then to the right of that there's the operations portion, and that briefly defines the operation that is occurring in that number as you can see with the start, pickle, flat polish, et cetera.

Q. After this document is issued, Mr. Lawson, can you tell us what it is used for at Chevrolet Livonia? Who sees them and what do they do with them after they see them?

A. These are used to develop our efficiencies using the labor hours specifically. They are used to develop the efficiencies in the specific department that this particular part would be or any routing part would be identifiable to, that would be the area that's used for efficiency purposes.

Q. Coming to the very top of item 27 of Defendant's Exhibit A-33, Mr. Lawson, I see the legend "Supersedes 3713797." What does that signify?

A. Okay. What that would mean is, there was another part number that had normally the same configuaration but this particular part had different hole locations in it, so this would be — I stand corrected. [3177] This particular one is the one that went into service. 3713797 is now replaced by 3744766. This replaced that particular part at that time.

Q. This is part No. 3744766?

A. That's correct.

Q. And the numbers and figures we see in the labor routing here pertain to the manufacture of 3744766?

A. Correct, only.

Q. I would like just to proceed over to the column a little bit beyond the center which has the legend "Reg. No." Do you see that, Mr. Lawson?

A. Yes.

Q. Can you tell us what the entries in that column signifiy?

A. This was the original labor routing, so there are many things that we picked up and you always do from part to part that you are able to use previous registered time studies. That's what the "R" stands for. There were specific time studies, delay studies, any particular method of developing a registered time study. And those hours that were from that delay study and time study and deriving the registered time study are utilized on this routing. [3178] And where you see "estimate," the "Est." would reflect that that was an estimate rather than having a registered time study available for this particular part.

Q. Mr. Lawson, you I think referred to the pickling but I don't think we have your testimony as to everything that is included in this labor routing. I think you can just kind of hit the high spots, the different steps going to whatever stage they go to.

A. Okay. This particular part runs through our pickle machine, goes to our flat polish, and there are all the breakdowns where you load, you unload. It shows the labor content for the indirect people that are on the line such as belt changers, relief man, plus your rerun allowance.

Going from there, this particular one went into the draw and subsequent trimming and piercing operations. This particular part, as shown on here, had to be deburred because of a specific die problem of separating the two parts. Then it goes to bell washer, an estimate for hand polishing, and shipped direct. This was a painted bumper.

Q. Can you tell us, Mr. Lawson, the significance of the entries where it refers to "total standard time per bar" on the second page of item 27 of Defendant's [3179] Exhibit A-33?

A. The total standard hours as shown on the extreme right opposite the total standard time per bumper is an accumulation of — our specific departments are for Flat Polishing 40, for .0109. 41 Department would be the forming complete of .0733. 42 Department is the polishing and that would be the .0089, for a total sum of .0931 total standard hours.

Q. You have referred, Mr. Lawson, to the specific part number referred to in this labor routing, item 27, as being a painted bumper. Was there a corresponding bumper that was plated?

A. There was. This specific bumper has another part number. The only difference, one is plated and one is painted. The same operation. They are identical through that point. Because of scheduling options, one gets painted, one gets plated.

Q. Is there anything different on the labor routing for the plated bumper? Would they do anything that is not done on the painted one?

A. As you see this particular routing, they would be identical up through 100 operation.

Q. Then what would happen?

A. Then all you would see from there would be, [3180] if it was done at Livonia, it would be going through polishing and plating and shipped direct out the door.

Q. The polishing you referred to is polishing over and above the polishing that is referred to in —

A. If required, it would be as-required.

Q. Can you tell us with respect to the role of the lubricant whether that has anything to do with the differences between the labor routing for the painted bumper and the labor routing for the plated one?

A. In all my association with routings, we have never had a routing designating differences in lubrications.

Q. Mr. Lawson, I would like to have you go now to item 28 in Defendant's Exhibit A-33 and just tell us briefly what that is, if you know.

A. Okay. This is again the same part number indicated. This is again the labor routing for this part, this is the second issue of it; it is a carryover part, as noted. We issue every year if it is a new part as a carryover part and this one was issued May 1, 1958. The date that the routing comes out is usually subsequent to the part release from the corporation. So you are looking at the same part a year later.

[3181] Q Can you tell us what if any differences exist between the labor routing, item 28 of Exhibit A-33, and the labor routing item 27 of Exhibit A-33?

A There are some differences. There's differences in total labor content in the part basically due to updating the routing and picking up more registered time studies. I would like to probably say the biggest significant change was in Operation 100 where, after a year's production, we were able to identify that the labor hours was greater than actual requirement and it was reduced considerably, which reflected in the total labor hours of the part.

Q Can you compare the physical things being done under the item on the second sheet of item 27 bearing the title "Hand Polish Complete" and underneath it "Polishing Jacks" with the physical things being done under this second page of item 28 under the title "Hand Touch-up One Percent" and "Polishing Jacks." Can you compare those two?

A This is what I was referring to, yes. This is the significant difference between the two years. In item No. 27, we had "Hand Polish Complete" with an estimate as far as a registered time study. So arbitrarily on a new part, you give it your best shot [3182] as far as what you think would be required. And after a year's production, it was determined that only one percent had to be touched up, which reduced the labor hours from .0089 to a .0002.

Q Can you tell me whether the expression "Hand Polish Complete" in item 27 has the same or a different meaning than the expression "Hand Touch-up One Percent" in item 28?

A The expression is identical. We would be using identical pieces of equipment and all this would be identifying is a much lower percentage of parts that would require any touch-up, and generally your labor route reflects that decrease.

Q I notice, Mr. Lawson, that under the column "Reg. No." on the second page of item 28 adjacent to that "Hand Touch-up One Percent" there is no entry. Can you explain that?

A Would you ask the question again, sir?

Q I notice that under the column "Reg. No." no entry there. Can you explain that for us, Mr. Lawson?

A Oh, right. Okay. This was no longer an estimate as shown on the second page of the 1957 routing. This is an understanding from time checks that were done that we would only be one percent of the parts, so it is [3183] no longer an estimate.

Q Can you compare that with a registered time study?

A There is no registered time study in this particular instance or else there would be a number shown there with an R. But it is an identification indicating that we are no longer estimating it but we are satisfied with a one percent touch-up.

Q Turn to item 29, Mr. Lawson, of this same Defendant's Exhibit A-33 and tell us what that is.

A I recognize that as being the labor routing for the 1959 model part. As shown, it is August 1, 1959.

Q Is that the same or a different part?

A It is the identical part, it is 3744766.

Q Just so we are sure we understand you, when you say identical part, that part was not changed due to a model change?

A No. We call it a carryover part.

Q It is physically identical?

A Physically identical. If there is any significant change, it would be noted by a part number change.

Q Can you tell us the differences between the labor routing constituting item 29 of Defendant's Exhibit [3184] A-33 and the preceding labor routing constituting item 28?

A There are some differences. Again, there were additional registered time studies added to the routing. There is a significant difference in the pickling. As you will notice under pickling there is a contingency number of 1370 per hour on the item 28 and 1375, so there was a change. There is a manpower reduced in flat polish, in Operation 20. So there are some physical changes that did happen on this routing from '58 to '59.

Q Can you tell us as to the overall labor hours per bumper how the two items, namely, item 28 the May 1, 1958 labor routing, and item 29, the August 1, 1959 labor routing, compared? How did they compare?

A The hours did increase in 40 Department, 41 —

Q Excuse me just a minute, Mr. Lawson. Can you first tell us the total increase in the total labor hours?

A Okay. In the total labor hours for the 1958, it was .0917. And in the '59 routing it was .1059. There was an increase.

Q Can you tell us where that increase took place.

[3185] A The increase took place in two departments. In 40 Department there was an increase of .0114 in 40 Department, and there was an increase in 41 Department from .0786 up to .0914. And that was due primarily to a change in manpower on the operations in 41 Department, not so much the time but as a manpower change reflecting in the routing.

Q You refer to 41 Department. What was involved in 41 Department?

A If you can compare the two routings, let me refer specifically here. In the Operation 40, you went from the one big designation — I am referring now to the 1959 routing.

Q Item 29?

A Item 29. If you will see where it says, if you will look in the sequence number 40, trim ends and part, you have a significant increase in labor hours over the previous year of .0114 and the previous year was .0079. That was basically the main area of the routing increasing was in that loading of that part on that particular operation.

Q Can you tell us what connection, if any, there was between that increase and the lubricant used in forming the bumper?

[3186] A Absolutely none.

Q Can you tell us whether there is any connection between any other changes in the August 1, 1959 labor routing in relation to the May 1, 1958 labor routing that had anything to do with the lubricant?

A There were no changes attributed to any lubricant on this particular routing.

* * *

[3193] Q. Mr. Lawson, I would like to ask you with respect to the phosphate coatings on the flat polished bumpers, and I would like to ask you whether there have been occasions when you have attributed forming difficulties to the character of the phosphate coating as to whether it is sufficient or not.

A. The only time that there would be something that would become aware to me in any part of my job, if there should have been a deficiency that I picked up that I would have requested our lab to get in strictly through a malfunction in the operation, that they would have checked it and made sure that it is correct or if it isn't, they will get it correct and, hence, get us out of our problem.

Q. Any time in your experience, Mr. Lawson, have you attributed the lubricant as solving any problems in connection with any particularly difficult draw?

[3194] A. The answer to that is no, because at the time even in the very beginning when you're starting when your tool isn't in topnotch shape, you would apply any lard, oil, et cetera, that you might have available from general stores at the press. So I couldn't ever say that we have ever looked for a specific lubricant to use even while we're in initial stages of tryout, even when it's very difficult to form the part until the die is in tune.

Q. And after the die is in tune, what changes?

A. As long as there's an adequate supply of phosphate and lube, there are no problems in forming.

Q. By "adequate," what do you mean?

A. To the specifications as monitored by our chemical lab people and our flat polish, which is monitored daily.

Q. Have you ever had occassion to request that a particular lubricant be used or changed?

A. Absolutely not.

* * *

Lawson — cross

[3308] Q. Pardon me?

A. There is noted a ballpark number. Like I said, it's a ballpark. There is a designation there, correct.

Q. So that, for example, if then was today and we had a 1959 bumper part, Chevrolet would have displayed on it what that part approximately costs. Is that right?

A. I would say that is close to being correct, yes.

Q. The same would have been true of Pontiac and Oldsmobile? You shook your head. Does that mean "yes" for the Reporter?

A. Yes, that's correct.

Q. Basically, then, each division would know approximately what the other divisions' bumpers were costing?

A. That's correct.

Q. And this is information that was basically between the divisions readily available?

A. Privileged to certain individuals of each division.

* * *

Lawson — direct

[3130] Q What contact have you had in your experience at Livonia, Mr. Lawson, with the particular lubricants that were used over the years?

A The particular lubricants that's been used over the years at Livonia are not mine as a responsibility I am not responsible for the products used. I am not often told when the products are changed or modified. That's a specific responsibility of our Metallurgical Department. The only time that I would become involved in any one of the number of jobs that I have held is if we were having trouble with the formability of the part. And that would be if from having worked with it for years, that we would recognize and get ahold of our metallurgical people and let them react accordingly. They would be the ones to take the scientific data of testing it and making the exact . . .

* * *

Lawson — cross

[3269] Q As I understand it, those standard sheets cover a commercial bumper that ended up being painted. Is that correct?

A That's correct. That part number is specific to a painted bumper. There's another part number that is identical to that that is plated.

Q Why did you choose a part number that was going to be painted when you had a part number that ended up being plated as well?

A I don't understand the question, sir.

Q Well, you certainly had standard sheets, did you not, with respect to the same bumper that you chose that applied to a bumper that was plated. Isn't that right?

A That's correct.

Q Why did you choose standard sheets for a part that was painted and was not plated?

A To my knowledge, that's the only part that covered the area of this problem that we're discussing today.

Q What do you mean by it is the only one that [3270] covered the area?

A That went as far back as 1957.

Q Was the bumper being plated in 1957?

A Correct.

Q So why wouldn't that suffice?

A For that one year it was plated.

Q Was it not plated in any subsequent year?

A Yes, it was.

Q What years?

A '58.

Q Any any year subsequent to '58?

A Not to my knowledge.

Q Did you examine the sheets?

A Yes.

Q And it was never plated after '58?

A To my knowledge, it was never plated after '58.

Q So that for the period from 1958 to 1967, this bumper that was being made for commercial vehicles was in no way plated at General Motors or by General Motors or for General Motors Chevrolet Division?

A I don't undertand your question.

Q As I understand it, you say this part 3744766 was a painted part.

[3271] A Correct.

Q What was the number of the part that was plated?

A One part number up from that.

Q 67?

A 67.

Q Is it your testimony that the 67 part only went up to 1958?

A I'm not sure if it was '57 or '58. I'll have to doublecheck my notes.

Q Did another part replace it?

A I'm sure there was another part. That was a regular production option and whether it was replaced or not on another vehicle — I don't think there would be another part on the vehicle other than the painted part in subsequent years.

Q In fact this painted part that you referred to, did that continue at the same volume let's say in 1959 or 1960 that it was in previous years or was it cut back in production?

A I'm sure there was a variance in production rate from year to year depending on the schedules. As far as being cut back, I think it would only be determined by marketplace and what the schedule dictated.

[3272] Q Do you know whether it was cut back substantially?

A I would have no idea why it would be cut back. I'm sure it would be as the marketplace dictated.

Q But do you have any idea as to whether in fact it was cut back?

A I have an idea that in a few late years —

Q In the sixties?

A No, I'm talking fifties. That the production had a large decrease, but then it picked right back up in subsequent years.

I don't have those numbers at my fingertips, but I do know that it had a range of numbers.

Q It is a fact, isn't it, that for the projected year 1960 it was expected that production was going to be reduced by 85 percent?

A I have no answer to that question. I have no knowledge of the statement anywhere.

Q I show you an analysis of bumper burden center requested standard labor for Chevrolet Motor Division spring and bumper plant dated June 10, 1959, and ask you whether you ever saw that document before?

A (Pause) To my knowledge, I have never seen this before, this specific piece of paper.

[3273] Q And counsel never called this to your attention?

A Not to my knowledge.

Q Who in fact selected the part number 3744766? Was that counsel?

A I can't answer that. I don't know who it was. I didn't.

Q But it wasn't you, was it?

A It wasn't me.

* * *

[3275] Q Mr. Lawson, I call your attention to the part number which you were testifying about, 3744766, and ask you to take a look at the code D next to that number in the far right-hand column, and ask you whether or not you were aware of the fact that the production was going to be reduced by 85 percent on that particular part in the upcoming year?

THE MASTER: If it was a fact.

A Not knowing this document, I can't give an answer on it.

Q The document does say that production was going to be reduced by 85 percent on that item, does it not?

A That's what that piece of paper says.

* * *

[3306] Q. Basically, the decisions entering into use of lubrication back in the period 1955 through 1968 or 1969 would have been by groups of people other than yourself, as I understood your testimony?

A. It's by other people but not necessarily by group.

Q. Okay. By other people?

A. By other people.

* * *

[3357] Q Do you know from your personal knowledge the lubes that were being used in 1957 when you got there and have a personal recollection of it today?

A No.

Q And you have no recollection of the situation in 1958 as to the lubes that were being used?

A That's correct.

Q The same is true of 1959?

A That's correct.

Q And the same is true of 1960?

A That would be correct.

Q And the same is true of 1961?

A That would be correct.

Q The same would be true of 1962 and 1963 when you were in the Standards Department?

A That would be correct.

Q Now, did you have personal knowledge of what lube was being used in 1964?

[3358] A I could have known —

Q Not what you could have known. Personal knowledge, sir. I am not asking you to reason back.

THE MASTER: He is going to have to try to remember whether he had personal knowledge at that time.

If you remember whether you had personal knowledge, say so. If you don't, say you don't remember.

THE WITNESS: I can't remember back if I knew specifically.

BY MR. BENDER:

Q How about 1965?

A At that time I would obviously become much more aware. To coach my memory to name you the specific brands at that particular time with all the variables, it would even be difficult then. But I'm sure at that time and possibly even earlier I knew. But I can't, in all honestly, say that I could name them off to you at this time.

Q What was your function in 1965?

A That's when I was back out on the floor working directly in the department in a supervisory capacity.

* * *

[3360] BY MR. STARGATT:

Q Mr. Lawson, I take it that in your capacity [3361] as master mechanic and all the jobs that you had leading up to that from your job as apprentice to the journeyman in 1957, you have been principally concerned with the mechanical operation of the dies and presses?

A That's correct, sir.

Q I have noted on some of the labor routings that were introduced as Plaintiffs' exhibits by Mr. Bender during the course of your cross-examination that there are references to the plating operations.

A That's correct.

Q Does that fall within your function?

A No, sir. I am aware of it, you know. But once it gets past buffing, it is in the lab area also. Our Metallurgical Department have responsibility.

The only relationship that I have in the plating operation would be in the time that I spent on the floor, we used to repair the racks in the plating. Which is really a very small part of the plating operation. I am not aware of the chemical analysis, you know. I'm not a metallurgist.

Q Who runs the Plating Department? Not the person, but what group?

A The metallurgical lab.

Q Who selects the lubricants to be used in [3362] connection with the forming of the bumpers themselves?

A That also falls under their responsibility.

Q So the metallurgical lab has responsibility for plating and for lubrication selection?

A That's correct.

Q You are hesitating a little, so be more complete if you wish to.

A Well, we work together. If we see a problem mechanically, you know, they are also our guide and help for a lot of different lubricants other than just what we have for using as a topcoat. You realize that?

Q For lubricating the machines themselves?

A The machines, sure.

Q And they give you that kind of assistance?

A Sure.

Q In connection with the lubricating lines and let's call it topcoat, if that is the word that is usually used, for putting phosphate and lubricant on the steel plate, is the same lubricant used for every different type of bumper part that is formed during the course of any particular time period?

A I understand the question. No. We indiscriminately, depending on the width of the sheet, run them through any flat polish lines that's open. [3363] So whatever material or lube, topcoat, would be in that line would go on that part. And today it could be one part, this afternoon it could be another part, or any combination possible. We don't select what part goes in what line through flat polish, nor do we select that that part has to go through a specific press line. It's indiscriminate. We build in as much flexibility as possible for scheduling purposes.

Q So that a sheet of steel that is coated with phosphate and then lubricated might be indiscriminately used to form part of the front bumper or part of the rear bumper?

A That's correct.

Q Or any subpart involved?

A That's correct.

Q Is this something that is known to the metallurgical laboratory?

A Oh, definitely They have people that are right on the floor making sure — of course there's always times when there is a slip-up, you know. We have people on the floor, they have people right on the floor that are doing testing daily and making sure the concentrate is correct, that it isn't too high, too low. There is a spec, you know, so many mils per sheet and they have [3364] that facility of making sure that it is correct when it gets out of the flat polish and into the press forming area. That's their responsibility to make sure on the amount on it, you know, not what the part is going to make.

Q That the amount of lubricant is right?

A That's right, and phosphate. All of that is checked. It is checked across the board.

* * *

[3378] THE MASTER: Now that he have that understanding, you can use the words "commercial bumper" and "B bumper."

THE WITNESS: Okay.

What you're really looking at, on this [3379] bumper, the B body bumper, it has a much more severe elbow radius. It is much deeper on the A surface of the B body bumper. It has a deep reverse between the impact surface and the lower impact surface, which would be a reverse in the draw. The angle of the outboard cup would have —

BY MR. STARGATT:

Q When you say the outboard cup, what do you mean?

A The boot section of the bumper, which is the extreme outboard ends of the bumper.

Q You mean the ends of the bumper?

A Yes, this end of the bumper. The more vertical and deeper it is, the more restrictions along with the tightness of the elbow radius makes a difficult form. The irregularity of the shape all through the part, basic irregularity, many high parts and low surfaces in various compressed areas, it's very close to each other.

In comparison to the front commercial bumper, you're looking at a relatively top surface that's short. It has an extreme soft elbow, and the end of the bumper is much more open.

So what that really does to you is, this [3380] allows the material to flow in smoothly. The material on the B body bumper, because of the restrictions like right here, which is the extreme point of the elbow, is very very thin. Right up that surface, two inches away on the top surface in the vertical wall it's very very thick. So what you are doing is, you're taking the metal out here and collapsing it together along with stretching out in an adjacent area.

So what you've got, you've got two dissimilar things happening in a concentrated area, giving you a difficult form part.

* * *

IN THE U.S. DIST. COURT FOR THE DIST. OF DEL. [ACCOUNTING TRIAL TESTIMONY]

Weil — cross

* * *

[3526]* MR. BENDER: Mr. Stargatt, I would like to offer in evidence the letter that was sent to Mr. Waldrop by Mr. Ziesenheim dated December 10, 1968, and also the notice to take the deposition under the caption of both lawsuits. By "both lawsuits" I refer to the fact that a lawsuit was filed in 1968 for the purposes of obtaining discovery and bringing the complaint down to date. By discovery, I mean discovery up to the date of that lawsuit. I would like to put a number on both of those.

THE MASTER: Mr. Frost?

MR. FROST: I would just like the record to show that this December 10, 1968, letter is indicated as received in the GM Patent Section on December 12, 1968. I just think the record should show that. As to admission of the letter as an exhibit as such, I have no objection.

* * *

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* Accounting trial transcript

IN THE U.S. DIST. COURT FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL EXHIBIT NO. A-289

December 10, 1968

Neal A. Waldrop, Esq.
Harness, Dickey & Pierce
700 Fisher Building
Detroit, Michigan 48202

Re: *Devex Corporation et al. v.*
General Motors Corporation

Dear Neal:

Herewith is the notice for the depositions we've arranged for this Friday and next Tuesday. As I mentioned to you earlier, I intend to inquire inter alia about scrap reports, time studies, method analyses, evaluations, and the like which if they exist I believe will show the benefits obtained from the use of the Henricks process by General Motors. It would advance matters, I am sure, if we could have any such materials that could be located now present at the depositions. You indicated your willingness to cooperate in this respect and I will certainly appreciate whatever you are able to do in this regard.

Sincerely,

Frederick B. Ziesenheim

FBZ/pap
Enclosure
cc: George N. Hibben, Esq.
William S. Pettigrew, Esq.

PLAINTIFFS ACCOUNTING TRIAL EXHIBIT NO. A-290

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION et al.,
Plaintiffs,

v.

GENERAL MOTORS CORPORATION,
Defendant.

DEVEX CORPORATION et al.,
Plaintiffs,

v.

GENERAL MOTORS CORPORATION,
Defendant.

CIVIL ACTION
No. 3058

NOTICE TO TAKE DEPOSITION

CIVIL ACTION
No. 3545

TO THOMAS S. LODGE, ESQUIRE, CONNOLLY, BOVE & LODGE, THE FARMERS BANK BUILDING, WILMINGTON, DELAWARE 19899, ATTORNEY FOR THE DEFENDANT.

TO GEORGE N. HIBBEN, ESQUIRE, HIBBEN, NOYES & BICKNELL, 332 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS 60604, ATTORNEY FOR THE DEFENDANT; and

TO NEAL A. WALDROP, ESQUIRE, HARNESS, DICKEY & PIERCE, 700 FISHER BUILDING, DETROIT, MICHIGAN 48202, ATTORNEY FOR THE DEFENDANT.

PLEASE TAKE NOTICE that, the plaintiffs, Devex Corporation et al., will take the deposition of Mr. Ralph Weil upon oral examination pursuant to the Federal Rules of Civil

Procedure on December 13, 1968 at 10:00 A.M. in the conference room in the Patent Law Section of General Motors Corporation on the 15th floor of the General Motors Building, Detroit, Michigan, and also of Mr. Charles Palmer and/or Mr. A. E. Byrne on December 17, 1968 at the same place and hour. You are invited to attend and cross-examine.

This 10th day of December, 1968.

/s/ FREDERICK B. ZIESENHEIM

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[CERTIFICATE OF SERVICE
OMITTED IN PRINTING]

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
[ACCOUNTING TRIAL TESTIMONY]

Hargesheimer - cross

* * *

*[5527] A Savings was material, yes.

Q Not savings was just material, but there were savings in the material itself?

A Yes, there was material savings, yes.

Q And that was one of the biggest items in the savings, wasn't it, or the biggest item generally, from your experience?

A I think that is correct, yes.

Q And actually the fact is that there were plenty of cost studies that were made at Saginaw; isn't that right?

A We had a Cost Estimating Department, yes.

Q Well, isn't it fair to say that you had cost studies on all of your parts whenever you switched over and there was not just a change in design or something like that?

A We always had costs. For anything whatsoever, we always made a cost study, standard practice.

Q In fact, you referred to the fact that you had so many cost studies that you would have filled a bank vault with them; isn't that right?

A Yes. We had an awful lot of them. We certainly did.

Q Now, were those cost studies retained at all?

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* Accounting trial transcript

[5528] A No. Well, when I say retained, they are retained for three years.

Q Now, you knew about this litigation or the people at Saginaw knew about this litigation certainly in '62 and '63?

A Only myself probably. I don't think everybody knew about it.

Q Well, Mr. Kemmer knew about it. Was that his name?

A He might have known about it. I am not sure.

Q Didn't he meet with the people from Parker, too?

A Yes. He talked with Parker people, so he probably did know.

Q Did anybody ever tell you to keep the cost studies which you had which were so numerous after you learned about this?

A We had a standard practice of getting rid of the cost studies after three months on everything, nothing to do with cold extrusion at all.

THE MASTER: Three years, you mean?

THE WITNESS: Three years, yes.

BY MR. BENDER:

Q Go ahead.

[5529] A All of our cost estimate studies after three years were obsolete anyway. The costs were way out, so we threw them away automatically. That was nothing special, just a standard practice we always had.

Q And no one ever gave you instructions to retain them because of this lawsuit?

A No, never.

* * *

[ACCOUNTING TRIAL TESTIMONY]

Hargesheimer - direct

* * *

[5381] Q Did there come a time when you changed the lubricant that was used in connection with making the bearing cups?

A Yes.

[5382] Q And when was that and what did you change to?

A In 1962 we changed from Bonderlube 239 to Bonderlube 234.

Q Did that change make any difference in the appearance of the lubricant on the bearing cup?

A No, it did not.

Q Can you tell us what effect that change had on the forming operations in connection with the bearing cup?

A It had no effect on the forming at all that we know of.

Q Did you change your slug configuration as used on the bearing cup?

A No, we did not.

Q Did you change the tools?

A No, we did not.

Q Have you since made any other changes in the lubricants used on the bearing cups?

A Yes, we have.

Q When was that changed?

A We changed our neutralizing rinse from Parcolene 21 to Parcolene 24.

Q When did that change take place?

A In 1974.

[5383] Q Do you know what prompted that change?

A Yes.

Q Can you tell us what it was?

A Yes. It was prompted by the Patent Section to make the change, General Motors Patent Section.

Q Did that change alter the appearance of the lubricant on the slugs for the bearing cups?

A No, it did not.

Q Did you change the process in any way other than by changing the neutralizer?

A No, we did not.

Q Did the results of the process change in any way?

A No, it did not.

Q What was in production at the time you retired?

A Parcolene 24.

* * *

Hargesheimer - cross

* * *

[5486] Q So that it is fair to say, isn't it, that as depicted on PX-A-146-B-1, the extent of use by Saginaw of the accused practices expanded dramatically, even after the patent was held valid, isn't that correct?

A Yes.

* * *

Hargesheimer - cross

* * *

[5507] Q And how about the lubricant?

A The lubricant is very important. You can't flow metal without having a very good lubricant, especially an extrusion. Another category for extrusion is what we call mass metal forming.

In mass metal forming, in comparison to sheet metal forming, you are forming a mass of metal rather than bending a sheet around as you would with sheet metal. So mass metal forming maybe is a better definition of cold extrusion than anything else.

You are pushing a mass of metal through an orifice, the orifice created between the punch and the die, and you squirt the metal through it, as the Germans called it, "kaltspritzen."

Q And how about the materials that the dies are made of, is that also important?

A Very important, and, of course, the dies have to be made out of high-quality tool steel. And we use the molybdenum tool steels, M-4 mostly. Where we have extreme heavy loads, we use carbide punches, that is tungsten carbide.

* * *

[5508] Q Now, you were describing just before I asked you that last question about the tool steel the fact that in extrusion you have a mass metal forming, and the metal is, in effect, squirted.

A Yes.

Q Whereas in bumper forming, you are not really causing the metal to move. You are reshaping the metal; isn't that correct?

A Correct.

Q Certainly, as far as you are concerned, in this [5509] mass metal forming, which we call extrusion, and you have indicated that the lubricant is very important in that situation—

A Yes, it is.

Q As a matter of fact, in your paper you indicated that sometimes it makes the difference between success or failure; isn't that correct?

A Yes. If the lubricant fails, your part will fail, sure.

Q Actually, you referred to the third step as phosphate coating and lubricating and you said this is a very critical operation; isn't that so?

A Yes.

Q And that was a correct statement in 1969?

A I think so, yes.

Q And you said it can be the deciding factor in success or failure, and that was correct then, too, isn't that right?

I am reading from Page 5, Paragraph 3, what you call the third step is phosphate coating and lubricating.

A The statement where it says, "This is a very critical operation, just as the Germans discovered when they first extruded steel, it can be the deciding [5510] factor in success or failure."

Q Right.

A I think the Germans discovered that. Yes.

Q I am not asking whether the Germans discovered it. I am saying it can be the deciding factor in success or failure, that part of the statement is true, isn't it?

A Yes.

Q And the statement that "Whenever an extrusion operation goes sour, one of the first places to look for trouble is the coating of the solution."

That is a correct statement?

A Well, this was written in 1969, and between that date and today's date I have learned a little bit more and I am smarter, like you mentioned a little while ago. And we have learned that that is not the only thing that you look for and it is not necessarily the first thing.

We have learned to improve our lubrication process, so it is a lot more consistent than it used to be. We have automation in our lubrication, so we don't have as many problems as we used to. The old systems were hand barrel loaded and the operator had to watch, that is a poor system. But the new ones [5511] are automatic and we get a much better job. And we don't have the trouble that we used to have with the soaps with the older systems.

Q So you have advanced in the lubricating since '69?

A Absolutely. We have improved our equipment.

Q Sure.

A We have improved our equipment.

Q And—

A So that is not necessarily the first thing we look for now.

Q Right.

A Now we are more apt to look for material. The steel mills have not kept up with their part of it.

Q But as far as 1969 was concerned, that statement was true in 1969 when you wrote it?

A It probably was. We were using hand barrels then, probably.

* * *

[5537] Q Likewise, when you are deciding on what steel supplier to choose, you are making some test runs of the product that he has given you; isn't that correct?

A Yes, very definitely.

Q And you then choose what is best for Saginaw in terms of the product that has been supplied to you?

A Yes, we have to satisfy our metallurgist, because what is good for extrusion is not necessarily good for the strength that he wants, so we have to compromise with our metallurgist to make sure the material is what he wants and what we want for extrusion, so we work very closely with our metallurgist to get the right steel.

We modify our compositions quite readily.

Q I take it, then, as far as your knowledge, you were quite satisfied or Saginaw was quite satisfied with the use of the formulation of the lubricants that they were using right up through 1969, isn't that correct, in terms of the production?

A Yes.

Q They were getting the Parker system and the Parker lubricants and the Parcolene 21 and they were quite satisfied with the results; isn't that right?

A Yes.

Hargesheimer - cross

[5538] Q And you undoubtedly had other suppliers calling on you trying to sell other lubricants besides Parker?

A I would assume so, yes.

Q And actually you saw in your trips to the various other G.M. divisions that they were utilizing other lubricants besides the Parker lubricants?

A Right.

Q And you knew about all these alternatives that were then available when Saginaw decided to stick to and to maintain the Parker system, isn't that right, during the sixties now?

A Sure.

* * *

Hargesheimer - redirect

[5561] Q Now, I would like to have you turn to the portion of the pretrial order of Chevrolet Saginaw, and I would like to ask you if you have had an opportunity to read that section of the pretrial order?

A Yes, I have.

Q Do you recognize the process referred to in that part of the pretrial order?

A Yes, I do.

Q Did you have anything to do with it?

A We helped them write the specifications for [5562] their equipment.

Q Did you have any opportunity to see the process after it was set up?

A Yes, several times.

Q Where was it located in relation to your place of business, how many miles?

A About three miles.

Q And did you have a chance to inspect the slugs that were formed in the course of that Chevrolet Saginaw process?

A Yes.

Q Did you have a chance to examine the lubrication of the slugs?

A Just visually.

Q And what did your visual examination tell you as compared with the lubrication that you had on the products you were making at Saginaw Steering Gear using the Bonderlube 234?

A It looked the same. It appeared to be the same.

Q And did you have an opportunity to see the performance of the lubricant?

A Yes.

Q And can you compare that with what you had at Saginaw Steering Gear?

[5563] A The parts came out in a typical dark gray matte finish that they would off a good coating.

Q Did you then know that Chevrolet Saginaw was using Parcolene 24?

A No, I did not.

Q When did you first learn it?

A When I read this the other night.

Q Now, I wish you would do this, Mr. Hargesheimer: Would you just take into account now your experience in seeing this—well, when did you see this Chevrolet Saginaw process, what year?

You can use the pretrial order to refresh your recollection, if you like.

A Probably in 1967, just shortly before it was disbanded.

Q Well, had you seen it at any time early in the period when it was in use?

A Yes, we saw it back probably several times in '65 and '66.

Q Did you see it when it was initially put into use, that is the very first shakedown time period or were you not there at that time?

A No, I was not there then, at that time.

Q Now, I wish you would take into account, [5564] Mr. Hargesheimer, what you saw at Chevrolet Saginaw and take into account the experience that you have had at Saginaw Steering Gear since 1975, using the Parcolene 24, and tell us what difference exists in cold-forming using Bonderlube 234 lubricant with the Parcolene 24 neutralizer as distinguished from the Parcolene 21 neutralizer.

A May I have exactly what you want, now, the question?

MR. FROST: Would you read the question back, please.

(The Court Reporter then read back the pending question.)

THE WITNESS: I saw no difference in the cold-forming.

* * *

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
[ACCOUNTING TRIAL TESTIMONY]

Wojtowicz - direct

* * *

* [5702] Q And can you tell us with reference to those entries what the price of borax as of the date of Item 1 of Defendant's Exhibit A-35 was as purchased in the forms purchased by Montgomery Company?

A Our interest would be in the designation borax granular, 99-1/2 percent, bags, and under the subsection [5703] ton lots, warehouse, Chicago, to which we would add the freight and some additional commission to our supplier, giving us possibly a net price of about five cents a pound in our plant.

* * *

Wojtowicz - direct

[5704] Q Now, I would like you to turn, Dr. Wojtowicz, to Item 21 of Defendant's Exhibit A-35.

Can you tell us what that is, if you know?

A This is notification from the suppliers of the soap that we used in our soap borax formulation and [5705] we had used the arctic crystal granulated form of soap.

Q Can you tell us what the price is of that product?

A This notification advises us that the price of the soap would be 12 cents a pound.

* * *

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* Accounting trial transcript

IN THE U.S. DIST. COURT
FOR THE DISTRICT OF DELAWARE
(ACCOUNTING TRIAL TESTIMONY)

Kary - cross

* * *

* [7515] Q Now, do I understand that this lubrication committee had representatives from other Chevrolet plants?

A Yes.

Q There is a notation on PX-A-126 which says "These specifications were developed without considering [7516] whether patents may or may not be involved. In all cases, therefore, the supplier shall be required to assume patent liability."

Do you see that?

A This is written there.

Q Did you have anything to do with placing that notation on PX-A-126?

A No.

Q Do you know how it was put on there?

A We have a standards committee involvement from our central office and as the book was written up, it was sent. They were on our committee and they helped us put the book together. That was their involvement.

Q And did they put that notation on?

A As far as I know, they did.

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* Accounting trial transcript page

Q From central office?

A Yes.

* * *

[7526] Q And you can't state today the difference in cost per bumper between those two operations?

A Like I told you before, it is very simple if we have the applicator that puts on certain coating weight, and there is a difference in cost, then there has to be a difference in price per bumper.

Q No, I don't mean that. I mean in terms of the total production cost, including all of the ingredients that are incurred in cost, namely material, the direct labor and the burden. You are not in a position to testify and compare the cost of using 3833 as compared to Bonderlube 215, and you are not purporting to?

A All I can tell you is that there is practically no labor, because it is an automatic operation. The only labor concerned is our people add the material to the tank.

Q But you are not in a position to compare the cost, the final cost of the operation?

Did you say you are not?

A No, I am not.

Kary - cross

[7527] Q And do you know whether Chevrolet ever made any cost studies comparing the cost of operating with 3833, the soap and borax, as compared to 215?

A I am pretty sure we have made studies of this type, but I am not involved with that.

Q Have you ever seen any such studies?

A At a glance.

Q You have seen them?

A I have seen our master mechanic's office where we have sheets of this type and standards, but I don't get involved in it.

Q Now, I believe you testified that you are using the Bonderlube 243 pursuant to the suggestion of Mr. Schwartz today?

A Yes. He called and said that some people would like to come through our plant and see our operation, and I told him if there was any question on whether he wanted to see different types of lubes, we had the ability to put 243 on the job if he so wished.

Q Now, I believe you testified that at first Mr. Schwartz didn't give you an immediate answer, and then he came back and—

A He called me back on the phone.

Q Did you give us the full statement of that [7528] conversation as to what he said to you?

A I can't tell you word for word except the fact that he said, "Go ahead and put it in."

Q So that the line was set up with 243 in it just for purposes of the visit, the upcoming visit by the plaintiffs and their experts. That was the purpose of the conversation with Mr. Schwartz, wasn't it?

A I guess he would like to show people that the bumpers can be formed by various types of materials, and so all we did was demonstrate it.

Q Did you have anything to do with the shipment of the bumpers after that visitation, the shipment of the bumpers to the plaintiffs, in other words, the further run of the bumpers that are here in court?

A I personally didn't have anything to do with the shipment, no.

Q Do you know whether or not that was done on a Saturday and was also being run especially for the purposes of drawing off these samples that we have in court?

A No, I wasn't involved with that.

Q Now, you said something to the effect that Bonderlube 243 was used and it was used from some samples or some Bonderlube 243 that you still had [7529] around?

A Yes.

Q Now, as I see Defendant's Exhibit A-33, that document shows that the last usage of 243 was in 1976.

A Yes. We still had the material in the plant.

Q And how many drums of that material did you have at that time?

A I would have to venture a guess. I would say somewhere between three to six drums.

Q And how long did that three to six drums last?

A A drum will last us, I would say, a week or two on the line.

Q And did you reorder it?

A Yes.

Q Whom did you reorder that from? Just Parker?

A Sure. We are still using it today.

Q I note no reference to that in terms of this document that was marked for identification which goes through September of 1978, no reference to the fact that there was any 243 ordered.

THE MASTER: Where do you see the September of '78?

MR. BENDER: The footnote 1978 says January through September, nine months, down at the [7530] bottom, and the only entry is for the Kerns 3833.

THE WITNESS: What is your question? I don't understand.

BY MR. BENDER:

Q My question is: That reordering of Bonderlube 243 does not show up as of September of 1978?

A Oh, it was ordered after that.

Kary - cross

[7531] Q It was ordered after that?

A Yes.

Q And you are not meaning to tell this Court that Chevrolet Livonia switched over exclusively to Bonderlube 243 after the visitation by plaintiffs' experts and the lawyers in July of 1978?

A I don't get your question. Would you repeat that?

A Is it your statement, sir, that Chevrolet Livonia converted exclusively to Bonderlube 243 after the visit by plaintiffs and their experts, plaintiffs' attorneys?

A No. If we put it in two lines, we put it on No. 3 line and No. 5 line, and since we put it in there on those lines, it is still there today. The other lines, 1, 2, and 4, still have the Kerns 3833.

Q Now, is it your position that a drum would last one week on two lines, or is it one week on each line?

A Some of the lines are run more than others. I would say it is an average of half a drum to a drum a line a week.

Q And if it has been used exclusively for two lines since July of 1978, how did three to six drums carry you all of the way through September of 1978?

A Whatever we had was enough to carry us through. We have not changed.

Q On those two lines?

A I told you I don't know the exact number of drums, but we had some drums in the plant and this carried us through. When we were about to run out, we ordered some more. We never put any other material in those two lines. When we first made the change and the visitation was there, since then we had that material.

* * *

IN THE U.S. DISTRICT COURT
FOR THE DISTRICT OF DELAWARE
Plaintiffs' Accounting Trial Exhibit No. A-126-2

LUBRICATION STANDARDS
Chevrolet Manufacturing Practices

Coordinated by
Chevrolet — Central Office
Manufacturing Research and Development
Department
1967

* * *

General

This section contains Chevrolet standard specifications for metal working lubricants. Included are the various sulfur and chlorine base cutting oils, mineral oils, oils for metal stamping operations. Blended oils for machining application and their blending instructions are included.

"Selecting Press Forming Lubricants" explains the basic components of press forming lubricants and offers a guide for the selection of the proper lubricant for a particular operation.

Tests required and desired results will be listed on each specification sheet. Test procedures may be found in Section 80.00 Testing Methods.

* * *

These specifications were developed without considering whether patents may or may not be involved. In all cases, therefore, the supplier shall be required to assume patent liability. [This legend located along right side of original pages.]

* * *

IN THE U.S. DISTRICT COURT FOR THE DISTRICT OF DELAWARE PLAINTIFFS' ACCOUNTING TRIAL EXHIBIT NO. A-250-1

June 29, 1978

George Frost, Esq.
Patent Section
General Motors Corporation
General Motors Building
3044 West Grand Boulevard
Detroit, Michigan 48202

Re: *Devex v. General Motors*

Dear George:

This will confirm the understanding regarding the depositions of Messrs. Whiting and Church set forth in your letter of June 21, 1978 with minor changes noted hereafter.

1. We are moving the place for taking the depositions to Mr. Whiting's office located at:

Davis, Hoxie, Faithfull & Hapgood
45 Rockefeller Plaza
New York, New York 10020

The 9:30 A.M. starting time on July 19, 1978 is agreeable.

2. We will ask that you take Mr. Church's deposition first.

3. We are prepared to stay through Saturday, July 22, 1978, if necessary, to complete the depositions.

4. We are preparing the list you requested of the documentation considered by Messrs. Whiting and Church in

reaching their opinions and hope to have that in your hands at least a week in advance of the depositions.

5. No further notice from you on the depositions is necessary. We note that you will make arrangements for a reporter.

Turning to another subject. As I discussed with you a few days ago, Messrs. Whiting and Church desire to view some actual General Motors cold forming operations before giving their testimony. Pursuant to your tentative agreement, subject to your checking the availability of the plants and Bill Schuetz, we would like to show them some cold extrusion operations at Saginaw Steering Gear in Saginaw, Michigan and the cold forming of bumpers at Chevrolet-Livonia in Livonia, Michigan. We would like them to see the operation from beginning to end, i.e. from the steel material coming in to the finished piece ready for shipment or assembly going out.

We would like to go to Saginaw Steering Gear early in the morning (say 8:00 A.M.) of July 12, 1978 and to Chevrolet-Livonia in the afternoon of July 12, 1978 in that order, to accommodate some travel problems caused by the strike at Northwest Airlines.

Our entourage includes in addition to Messrs. Whiting, Church and myself, Messrs. Bender and Shortt, Mr. Whiting's assistant, Mr. Neagley, and possibly Lynn Alstadt.

As discussed with you, we plan no depositions or inquiries of GM personnel in the exercise.

Please let me know as soon as you can if we can go forward with this on July 12. We want very much that it be done before Messrs. Whiting and Church are deposed.

Thank you for your cooperation.

Very truly yours,

Frederick B. Ziesenheim

FBZ/slr

bc: Sidney Bender
Hubert L. Shortt
George Church
Richard Whiting
Lynn J. Alstadt

IN THE U.S. DISTRICT COURT FOR THE DISTRICT OF DELAWARE PLAINTIFFS ACCOUNTING TRIAL EXHIBIT NO. A-250-3

General Motors Corporation

July 12, 1978

HAND DELIVERY

Frederick B. Ziesenheim, Esq.
Blenko, Buell, Ziesenheim & Beck
301 Fifth Ave. Building
Pittsburgh, PA 15222

Dear Fred:

Devex Corporation et al v. GMC

This is to confirm the offer we made orally upon your arrival at Chevrolet Livonia today. As then indicated, we were prepared to conduct your experts Whiting and Church, together with supporting personnel, on a tour of bumper making facilities at Chevrolet Livonia. We offered to show them (a) bumpers being made with Kerns 3833 (soap and borax) over phosphate or (b) bumpers being made with Bonderlube 243 (soap only) over the same phosphate or (c) both.

Our proposal included the following inspections, in order:

1. Flat polishing of bumper steel blanks.

2. Coating of the flat polished blanks with phosphate and either (a) Kerns 3833 or (b) Bonderlube 243, or (c) both, in accordance with your choice.

3. Forming the coated blanks to form the bumper shapes.

4. Washing the formed bumpers preparatory to plating.

5. Plating the washed bumpers.

Very truly yours,

/s/ SAUL SCHWARTZ
Saul Schwartz
PATENT SECTION

SS: hl
cc: Messrs. G. E. Frost
W. A. Schuetz

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-250-4

General Motors Corporation

July 21, 1978

HAND DELIVERY

Frederick B. Ziesenheim, Esq.
Blenko, Buell, Ziesenheim & Beck
301 Fifth Ave. Building
Pittsburgh, PA 15222

Dear Fred:

Devex Corporation et al v. GMC

This is to confirm that on July 12, 1978, in accordance with your request, Plaintiffs' experts Whiting and Church, along with yourself and Messrs. Alstadt, Bender, Shortt and Neagley were conducted on a tour of manufacturing facilities at Saginaw Steering Gear and Chevrolet-Livonia.

At Saginaw Steering Gear your party was shown the manufacturing process for air pump rotors, rotary valve gear worm blanks, and universal joint bearing races. During your tour, all manufacturing operations were in progress with the exception of extrusion and restrike on the air pump rotors which operations were temporarily out of service for normal press maintenance. As you know, Saginaw Steering Gear uses only Parcolene 24 and Bonderlube 234. The parts you saw being cold formed had been treated with these materials only.

At Chevrolet-Livonia your party was conducted on a tour of the bumper making facility which tour included the flat polishing area, the coating area, the press area, the pre-plating wash area, and the plating area. In accordance with our offer and confirming letter of July 12, 1978, your party saw bumper stock being coated with Kerns 3833 (soap and borax) over phosphate and with Bonderlube 243 (soap only) over phosphate. In addition, you saw similarly coated material being press formed, washed and plated.

Very truly yours,

/s/ SAUL SCHWARTZ
Saul Schwartz
PATENT SECTION

SS:mj
cc: Messrs. G. E. Frost
W. A. Schuetz

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-133

General Motors Corporation

August 22, 1978

Sidney Bender, Esq.
Leventritt, Lewittes & Bender
Chrysler Building
New York, NY 10017

Re: *Devex v. GM*

Dear Mr. Bender:

The attached tabulation of material, labor, and burden data represents the result of our efforts to comply with your request for component part costs at Saginaw Steering Gear Division.

We have collected data for the representative accused component parts agreed to between the parties and, where applicable, for a single antecedent component part corresponding in structure and function to the representative part. Copies of engineering drawings for corresponding antecedent parts which you do not already have are enclosed. Since Saginaw Steering Gear did not generate component part costs as separate items, the tabulation provides only secondary data selected to reflect, as closely as possible, the conditions in effect at about the time the accused manufacture commenced

With respect to the tabulation, steel content and per pound cost were obtained from tool set-up sheets and material receipt records, respectively, of about the dates shown. Standard hours per part and labor rates were obtained from labor routings and factory cost of sales records, respectively, of about the dates shown. We have approximated labor rates prior to October 1961 by reducing the rates of that date by 3% per year. See our letter of January 12, 1976 to Mr. Ziesenheim. Burden rates were calculated from Comparative Cost Book data of about the dates shown and are applied as a percent of labor dollar content. The burden rates include premiums but not engineering and special tools.

Many of the representative accused component parts have no corresponding antecedent. This is because there was no earlier part manufactured or purchased at Saginaw Steering Gear which was structurally and functionally similar enough to be considered corresponding.

Finally, we have not located the labor rates for representative accused part nos. 7802914, 5699931, 5698444 and 7802928. We are working on this and will supply them as soon as possible. Similarly, we will supply the steel cost for corresponding antecedent part no. 5685382 and for representative accused part no. 5687703. The steel content, in pounds per part, was not documented for corresponding antecedent part nos. 5685382, 1456504 and 5685464 but can be calculated from the part configuration.

Very truly yours,

/s/ SAUL SCHWARTZ

Saul Schwartz
PATENT SECTION

SS:kp
Encl.
cc: Messrs. G. E. Frost

generic category	representative accused part number	steel pounds per part	steel cost dollars per pound	date of steel cost data	standard labor hours per part	labor costing rate dollars per std. hour	date of labor costing data	burden rate %	date of burden rate data
cyl. mtg. ball stud	5685382-A	.240	.1263	12/61	.00361	2.6306	1/62	387	1/62
pot coupling	5675275-M	.74	.0765	12/60	.01408	2.5584	8/60	343	8/60
outer race blk.	5699359	7.21	.1042	3/66	.04939	3.7838	11/65	474	11/65
U-jt. bearing	5672112	.12	.0918	9/58	.00573	2.4472	9/58	476	8/58
lower b.j. hsg.	5674921	.55	.0882	5/61	.01203	2.7003	1/61	445	1/61
upper b.j. hsg.	5674917	.50	.0882	5/61	.01152	2.7003	1/61	445	1/61
lower b.j. stud	5670985	.45	.1347	9/57	.01160	2.3189	7/56	456	7/56
upper b.j. stud	5670994	.28	.1383	11/57	.00780	2.3189	7/56	456	7/56
RVG worm blk.	5686604	1.2	.0982	9/60	.00257	2.5584	10/60	381	10/60
manual worm blk.	5673148-M	1.58	.0982	9/62	.00323	2.6690	7/62	399	7/62
bearing sleeve	5687703	.23			.00420	2.5218	2/59	310	2/59
upper control arm shaft	382409	1.75	.0830	10/63	.01455	2.7535	12/63	593	12/63
air pump rotor	7800949	2.17	.0792	8/67	.11713	2.6140	6/67	556	6/67
steering shaft	5699919	1.51	.1685	6/67	.01142	3.3552	1/67	348	1/67
steering shaft	7802914	.78	.1685	8/67	.01960		10/67	337	10/67
steering shaft	7802750	2.13	.1685	6/67	.00993	3.3552	1/67	348	1/67
steering shaft	5699931	2.35	.0707	8/67	.01340		10/66	338	10/66
steering shaft	5698444	1.88	.0707	8/67	.01311		10/66	338	10/66
steering shaft	7802928	1.36	.0707	8/67	.00986		10/67	337	10/67
lower control arm shaft	577926	1.74	.0958	6/61	.01153	2.7003	10/61	444	8/61

generic category	corresponding antecedent part number	steel pounds per part	steel cost dollars per pound	date of steel cost data	standard labor hours per part	labor costing rate dollars per std. hour	date of labor costing data	burden rate %	date of burden rate data
cyl. mtg. ball stud	5685382				.00797	2.3105	9/57	316	9/57
pot coupling	5675275	Purchased for $.382/part as of 12/60							
outer race blk.	None								
U-jt. bearing	1456504		.0842	8/57	.00438	2.3738	12/57	467	12/57
lower b.j. hsg.	None								
upper b.j. hsg.	None								
lower b.j. stud	None								
upper b.j. stud	None								
RVG worm blk.	5686604	Purchased for $.346/part as of 12/60							
manual worm blk.	5673148	Purchased for $.265/part as of 10/62							
bearing sleeve	5685464		.0848	8/57	.00350	2.3727	10/57	355	10/57
upper control arm shaft	382363	1.725	.0880	10/63	.01233	2.7789	11/63	575	11/63
air pump rotor	None								
steering shaft	None								
steering shaft	None								
steering shaft	None								
steering shaft	None								
steering shaft	None								
steering shaft	None								
lower control arm shaft	None								

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. PX-A-133

General Motors Corporation

September 13, 1978

HAND DELIVERY

Sidney Bender, Esq.
Leventritt, Lewittes & Bender
Chrysler Building
New York, NY 10017

Dear Mr. Bender:

Devex Corporation v. GMC

Further to our letter of August 22, 1978, listed below are labor costing rates and material costs not previously located. Please note that, after an extensive search, the material cost for corresponding antecedent part no. 5685382 still could not be located.

Representative Accused Part Number:	Labor Costing Rate Dollars/Standard Hour	Date of Labor Costing Rate
5699931	3.3552	January 1967
5698444	3.3552	January 1967
7802914	3.1471	October 1967
7802928	3.1471	October 1967

Representative Accused Part Number:	Steel Cost Dollars/Pound	Date of Steel Cost Data
5687703	.0888	August 1961

Very truly yours,

/s/ SAUL SCHWARTZ

Saul Schwartz
PATENT SECTION

SS/kp
cc: George E. Frost

IN THE U.S. DISTRICT COURT
FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-140 c

DEVELOPMENT OF COST SAVINGS FOR SAGINAW STEERING GEAR PARTS

Part Name	Accused Part Number	Cost	Infringing Volume	Unit Savings/ (Loss) Based on Mean Average of Saving/Cost Relationship of 60%	Net Savings/ (Loss)
Cyl. Mtg. Ball Stud	5685382-A	$.0766	703,102*	$ .0460	$ 32,343
Outer Race Blk.	5699359	1.8241	337,000	1.0945	368,847
U.J. Brg.	5672112	.0916	176,058,00	.0550	9,683,190
Lower Ball Jt. Hsg.	5674921	.2256	23,929,000	.1354	3,239,987
Upper Ball Jt. Hsg.	5674917	.2136	10,885,000	.1282	1,395,457
Lower Ball Jt. Stud	5670985	.2102	10,992,744*	.1261	1,377,358
Upper Ball Jt. Stud	5670994	.1393	13,832,701*	.0836	1,156,414
Bearing Sleeve	5687703	.0638	3,672,000	.0383	140,638
Air Pump Rotor	7800949	2.1806	1,927,000	1.3084	2,521,287
Lower Tubular Steering Shaft	5699919	.4260	9,119,715	.2556	2,330,999
Steering Gear Tubular Shaft	7802914	.4010	1,369,532	.2406	329,509
Intermediate Tubular Shaft	7802756	.5081	1,645,079	.3049	501,585
Upper Solid Shaft	5699931	.3631	10,764,794	.2179	2,345,649
Lower Solid Shaft	5698444	.3256	1,623,279	.1954	317,189
Steering Gear Solid Shaft	7802928	.2318	1,391,333	.1391	193,534
Lower Control Arm Shaft	577926	.3360	1,454,000	.2016	293,126
Pot Coupling	5675275-M		8,583,000	.1659**	1,423,920
RVG Worm Blank	5686604		21,689,000	.1965**	4,261,889
Manual Worm Blk.	5673148-M		12,629,000	.0669**	844,880
Upper Control Arm Shaft	382409		10,954,000	(.0401)**	(439,255)

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*24.7% of total production 1957 thru March 1967; thereafter 100%

**Computed actual savings/(Loss) from Mr. S. Schwartz' letters 8-22-78 and 9-13-78

IN THE U.S. DISTRICT COURT
FOR THE DIST. DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-140d-1

	NET SAVINGS AFTER DEPRECIATION							
Division/Part	**Facilities**	**Depreciation 8.33%**	**Project Volume**	**Depreciation Per Unit**	**Per Unit Saving Before Depreciation**	**Per Unit Saving After Depreciation**	**Infringing Volume**	**Net Savings After Depreciation**
Buick - Piston Pins	$279,437	$23,277	4,192,634	$.0056	$.0575	$.0519	24,322,000	$1,262,312
AC - Aircraft Shield						.0519	10,667,000	553,617
Inland Mfg. - Brake Hose Fittings	258,200	21,508	9,081,665	.0024	.0124	.01	11,371,300	113,713
Olds - Rear Axle Shaft	234,000	19,492	585,000	.0333	.6132	.5799	9,578,807	5,554,750
Olds - Pinions						.5799	4,244,055	2,461,127
Chevrolet-Tonawanda - Forge - Shank End of Tie Rod Socket	69,000	5,748	7,752,827	.0007	.0152	.0145	4,152,091	60,205
Fisher Body - Ternstedt Window Reg. Brg. Stud	102,149	8,509	8,558,000	.0010	.0174	.0164	28,188,497	462,291
Delco-Moraine - Booster Studs						.0164	37,601,392	616,663
Delco-Moraine - Adjuster Screw						.0164	102,564	1,682
Delco-Remy - Swaged Pole Shoes Cranking Motors	196,371	16,358	4,588,000	.0036	.0352	.0316	229,170,000	7,241,772
Delco Remy - Motor Clutch Sleeve	145,676	12,135	2,726,700	.0044	.0279	.0235	29,580,000	695,130
Delco Remy - Starter Clutch Shell	86,815	7,232	3,900,000	.0019	.0435	.0416	29,580,000	1,230,528
Delco Remy - Swaged Gen. Pole Shoes	45,500	3,790	787,955	.0048	.1248	.1200	24,380,000	2,925,600
Delco Remy - Heavy Duty Generator Pole Shoes						.1200	1,018,000	122,160

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-140d-2a

PX-A-140d-2a
LK/11/29/78

	NET SAVINGS AFTER DEPRECIATION							
Division/Part	**Facilities**	**Depreciation 8.33%**	**Project Volume**	**Depreciation Per Unit**	**Per Unit Saving Before Depreciation**	**Per Unit Saving After Depreciation**	**Infringing Volume**	**Net Savings After Depreciation**
Delco Remy - Cranking Motor Pinion/Collar Assembly	$497,064	$41,405	5,367,000	$.0077	$.1836	$.1759	5,690,000	$1,000,871
Delco Remy - Motor Clutch Shell and Sleeve Assembly	742,972	61,890	5,340,700	.0116	.1348	.1232	5,690,000	701,008
Delco Remy - Delcotron Segment						.1232	51,150,000	6,301,680
Diesel Equipment - Valve Lifter Plunger	394,075	32,826	32,760,609	.0010	.0048	.0038	105,972,315	402,695
Chevrolet-Bay City - Tie Rod Ball Jt. Stud	242,650	20,213	8,486,060	.0024	.0205	.0181	80,145,359	1,450,631
Chevrolet-Buffalo - Pitman Arm Ball Stud Seat						.0181	3,899,332	70,578
Fisher Body - Columbus - Striker Pin						.0181	67,958,372	1,230,047
New Departure - Hyatt - Inner and Outer Brg. Races - Thrust Brg.	3,144,102	261,904	8,132,280	.0322	.1247	.0925	44,464,669	4,112,982
Buick - Rear Axle Shafts	305,863	25,478	1,303,646	.0196	.2557	.2361	3,338,364	788,188
Delco - Shock Piston Rod	1,538,388	128,148	22,710,482	.0056	.0808	.0752	94,303,000	7,091,586
Chevrolet-Bay City - Ball Jt. Seats-Tie Rod	143,254	11,933	7,074,925	.0017	.0106	.0089	31,820,000	283,198
Delco Remy Motor Shafts	407,200	33,920	3,638,427	.0093	.1213	.1120	16,080,000	1,890,560
AC-Spark Plug Shell	900,000	74,970	57,976,800*	.0013	.0113	.0100	579,768,000	5,797,680

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*Average 10 years

IN THE U.S. DISTRICT COURT FOR THE DIST. OF DEL. PLAINTIFFS' ACCOUNTING TRIAL EXHIBIT NO. A-140e1

SUMMARY OF SAVINGS ON EXTRUDED PARTS

Page	Division/Part	Plaintiffs' Exhibit No.	Savings
	AC		
1	Aircraft Spark Plug Shield		$ 613,353
2	Spark Plug Shells	A-99	6,562,973
	BUICK		
3	Piston Pins	A-108	1,398,484
4	Rear Axle Shafts	A-100	853,630
	CHEVROLET-BAY CITY		
5	Ball Joint Seats	A-111	338,338
6	Special Studs	A-110	64,955
7	Tie Rod Ball Joint Studs	A-109	1,643,589
8	Transmission Lower Brake Band Adjusting Screw		179,763
	CHEVROLET-BUFFALO		
9	Pitman Arm Ball Stud Seat		79,936
	CHEVROLET-DETROIT FORGE		
9a	Corvair Rear Spindle		(154,056)
	CHEVROLET-MUNCIE		
10	Main Shaft	A-101	11,704
	CHEVROLET-CLEVELAND		
11	Prop Shaft End	A-112	1,508,962
12	Trans. P-L Lever		9,927
13	Trans. Stator Shaft	A-114A	1,593,137
14	U. Joint Bearing Race	A-112/113	1,441,405
	CHEVROLET-TOLEDO		
15	Transmission Converter Hub		18,555
	CHEVROLET-TONAWANDA FORGE		
16	Shank End of Tie Rod Sockets	A-103	63,055

Page	Division/Part	Plaintiffs' Exhibit No.	Savings
	DELCO-ELECTRONICS		
	Fuse Booster Cups (Est. Savings 102,000 × .0300)		3,142
	Fuse Housings (Est. Savings 96,000 × .0308)		2,957
	DELCO-MORAINE		
17	Booster Studs		$ 654,264
18	Brake Adjuster Screw Blanks		1,785
	DELCO PRODUCTS		
19	Piston Rings	A-104	290,095
20	Piston Rods	A-104	7,618,569
21	Piston Studs	A-104	105,344
	DELCO-REMY		
22	Cranking Motor Pinion and Collar Assemblies	A-119	1,044,619
22a	Delcotron Core		83,600
23	Delcotron Segment		6,896,043
24	Field Frame Generator	A-152/153	715,737
25	Heavy Duty Generator Pole Shoes	A-117	127,046
26	Motor Clutch Shell & Sleeve Assembly	A-120	767,117
27	Motor Clutch Sleeve	A-115	826,461
28	Motor Field Frames	A-150-151	2,243,896
29	Motor Shaft	A-118	2,047,412
30	Starter Clutch Shell	A-116	1,287,698
31	Swaged Generator Pole Shoes	A-117	3,041,976
32	Swaged Pole Shoes for Cranking Motors	A-114B	8,067,352
	DIESEL EQUIPMENT		
33	Disc Brake Retaining Bolts		30,621
34	Valve Lifter Plunger	A-121	505,999
	FISHER BODY-COLUMBUS (TERNSTEDT)		
35	Door Lock Striker Pin Blank		1,393,147
36	Window Regulator Bearing Stud	A-102	491,168
	INLAND DIVISION		
37	Ball Joint Sockets	A-125	184,064
38	Hydraulic Brake Hose Fittings	A-122	141,011

Page	Division/Part	Plaintiffs' Exhibit No.	Savings
	NEW DEPARTURE-HYATT		
39	Inner and Outer Bearing Races	A-124	$ 5,545,019
40	Outer Rings		1,500
	OLDSMOBILE		
	Motor Bodies (Est. Savings 582,000 × .0308)		17,926
	Ogives (Est. Savings 1,822,000 × .0308)		56,118
41	Pinions		2,602,030
42	Rear Axle Shafts	A-105	5,873,335
43	Sun Gear	A-123	142,457
	PONTIAC		
	Rocket Motor Bodies (Est. Savings 400,000 × .0308)		12,320
	SAGINAW STEERING GEAR DIVISION		
44	Air Pump Rotor		2,521,287
45	Bearing Sleeve		140,638
46	Cyl. Mtg. Ball Stud		32,343
47	Intermediate Tubular Shaft		501,585
	SAGINAW STEERING GEAR DIVISION		
48	Lower Ball Joint Hsg.		3,239,987
49	Lower Ball Joint Stud		1,377,358
50	Lower Control Arm Shaft		293,126
51	Lower Solid Shaft		317,189
52	Lower Tubular Steering Shaft		2,330,999
53	Manual Worm Blank		844,880
54	Outer Race Blk.		368,847
55	Pot Coupling		1,423,920
56	RVG Worm Blk.		4,261,889
57	Steering Gear Solid Shaft		193,534
58	Steering Gear Tubular Shaft		329,509
59	Upper Ball Joint Hsg.		1,395,457
60	Upper Ball Joint Stud		1,156,414
61	Upper Control Arm Shaft		(439,255)
62	U. Joint Bearing		9,683,190
63	Upper Solid Shaft		2,345,649
		Total	$102,464,776

55% Royalty on Savings = $56,355,623

IN THE U.S. DIST. COURT FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL EXHIBIT NO. A-140-E-2

VOLUME AND TOTAL SAVINGS FOR PARTS REPORTED IN APPROPRIATION REQUESTS OR COST STUDIES

Division	Part	Volume (In Thousands)	Total Savings
AC	Spark Plug Shells	579,768	$ 6,539,213
Buick	Piston Pins	24,322	1,247,687
Chevrolet, Bay City	Special Stud	151	2,427
Chevrolet, Parma	Propellar Shaft End	8,228	2,353,125
Chevrolet, Parma	V-Joint Bearing Race	96,094	1,441,405
Chevrolet, Tonawanda	Tie Rod Sockets	4,152	63,055
Delco Remy	Motor Pinion and Collar	5,690	1,044,619
	Clutch Sleeve	29,580	826,461
	Motor Clutch Shell and Sleeve	5,690	767,117
	Motor Shaft	16,880	2,047,412
	Clutch Shell	29,580	1,287,695
	Generator Pole Shoe	1,018	127,046
	Motor Pole Shoe	229,170	8,067,352
Diesel Equipment	Valve Lifter Plunger	105,972	505,999
Fisher Body, Columbus	Window Regulator Bearing Stud	28,188	491,168
Inland	Brake Hose Fitting	11,371	141,011
New Departure-Hyatt	Inner and Outer Bearing Race	44,465	5,545,019
Oldsmobile	Sun Gear	491	142,457
Saginaw Steering	Manual Steering Gear Worm	12,629	844,880
	RVG Worm	21,689	4,261,889
	Pot Coupling	8,583	1,423,920
	Upper Control Arm Shaft	10,954	(439,255)
Chevrolet-Detroit Forge	Corvair Rear Wheel Spindle	648	(154,056)
Buick	Rear Axle Shaft	3,338	853,630
Chevrolet-Muncie	Transmission Main Shaft	12	11,704
	TOTAL	1,278,663	$39,442,980
		$ 39,442,980	
	Average Unit Savings =	1,278,663,000 =	$ .0308

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-233

ROYALTY ON EXTRUDED PARTS

(Opinion of Richard Whiting)

				Royalty (% of savings)				
Division/Part	Net Savings After Depreciation (PX-A-140d-1-2)	Years	Base	+ for Strength	+ for Cleanability	+ for Inflation	Total	Reasonable Royalty
AC								
Aircraft Spark Plug Shield	$ 553,617	'62 - '68	50%	—	5%	3%	58%	$ 321,098
Spark Plug Shells	5,797,680	'59 - '68	50%	—	—	4%	54%	3,130,747
BUICK								
Piston Pins	1,262,312	'64 - '69	50%	—	—	3%	53%	669,025
Rear Axle Shafts	788,188	'67 - '69	50%	—	5%	1%	56%	441,385
CHEVROLET-BAY CITY								
Ball Joint Seats	283,198	'65 - '69	50%	5%	5%	3%	63%	178,415
Special Studs	58,460*	'62 - '69	50%	5%	5%	5%	65%	37,999
Tie Rod Ball Joint Studs	1,450,631	'61 - '69	50%	5%	5%	5%	65%	942,910
Transmission Lower Brake Band Adjusting Screw	161,787*	'62 - '68	50%	—	5%	3%	58%	93,836
CHEVROLET-BUFFALO								
Pitman Arm Ball Stud Seat	70,570	'59 - '62	50%	5%	5%	1%	61%	43,053

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*Savings before depreciation less 10% estimated depreciation (See PX-A-140e)

			Royalty (% of savings)					
Division/Part	Net Savings After Depreciation (PX-A-140d-1-2)	Years	Base	+ for Strength	+ for Cleanability	+ for Inflation	Total	Reasonable Royalty
CHEVROLET-DETROIT FORGE								
Corvair Rear Spindle								
CHEVROLET-MUNCIE								
Main Shaft	10,534(*)	'68 - '69	50%	—	—	0%	50%	5,267
CHEVROLET-CLEVELAND								
Prop Shaft End	1,358,066(*)	'57 - '64	50%	—	5%	2%	57%	774,098
Trans. P-L Lever	8,934(*)	'64 - '69	50%	—	5%	3%	58%	5,182
Trans. Stator Shaft	1,433,823(*)	'64 - '69	50%	—	5%	3%	58%	831,617
U. Joint Bearing Race	1,297,265(*)	'57 - '64	50%	—	5%	2%	57%	739,441
CHEVROLET-TOLEDO								
Transmission Converter Hub	18,555	'61 - '69	50%	—	—	5%	55%	10,205
CHEVROLET-TONAWANDA FORGE								
Shank End of Tie Rod Sockets	60,205	'63	50%	—	—	—	50%	30,102
DELCO-ELECTRONICS								
Fuse Booster Cups	406***	—	50%	—	—	—	50%	203
Fuse Housings	386***	—	50%	—	—	—	50%	193

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*Savings before depreciation less 10% estimated depreciation (See PX-A-140e)

**All cleaning at Saginaw; see Defendant's answer to Interrogatory 71 of Sept. 13, 1977.

***See Diesel Equipment valve lifter plunger for unit savings after depreciation (PX-A-140d-2)

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			Royalty (% of savings)					
Division/Part	Net Savings After Depreciation (PX-A-140d-1-2)	Years	Base	+ for Strength	+ for Cleanability	+ for Inflation	Total	Reasonable Royalty
DELCO-MORAINE								
Booster Studs	$ 616,663	'65 - '69	50%	—	5%	3%	58%	$ 357,664
Brake Adjuster Screw Blanks	1,682	'65 - '66	50%	—	5%	0%	55%	925
DELCO PRODUCTS								
Piston Rings	261,086(*)	'62 - '66	50%	—	5%	1%	56%	146,208
Piston Rods	7,091,586	'62 - '66	50%	—	—	1%	51%	3,616,709
Piston Studs	94,810(*)	'62 - '66	50%	—	—	1%	51%	48,353
DELCO-REMY								
Cranking Motor Pinion And Collar Assemblies	1,000,871	'65 - '66	50%	—	5%	0%	55%	550,479
Delcotron Core	75,240(*)	67	50%	—	5%	0%	55%	41,382
Delcotron Segment	6,301,680	'62 - '67	50%	—	5%	2%	57%	3,591,958
Field Frame Generator	44,120***	—	50%	—			50%	22,060
Heavy Duty Generator Pole Shoes	122,160	'55 - '62	50%	—	5%	3%	58%	70,853
Motor Clutch Shell & Sleeve Assembly	701,008	'65 - '66	50%	—	5%	0%	55%	385,554
Motor Clutch Sleeve	695,130	'53 - '60	50%	—	5%	2%	57%	396,224
Motor Field Frames	2,019,506(*)	'55 - '57 '65 - '69	50%	—	5%	4%	59%	1,191,509

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*Savings before depreciation less 10% estimated depreciation (See PX-A-140e)

**All cleaning at Saginaw; see Defendant's answer to Interrogatory 71 of Sept. 13, 1977.

***See Diesel Equipment valve lifter plunger for unit savings after depreciation (PX-A-140d-2)

			Royalty (% of savings)					
Division/Part	Net Savings After Depreciation (PX-A-140d-1-2)	Years	Base	+ for Strength	+ for Cleanability	+ for Inflation	Total	Reasonable Royalty
Motor Shaft	1,890,560	'62 - '65	50%	—	5%	1%	56%	1,058,714
Starter Clutch Shell	1,230,528	'53 - '60	50%	—	5%	2%	57%	701,401
Swaged Generator Pole Shoes	2,925,600	'55 - '57	50%	—	5%	1%	56%	1,638,336
Swaged Pole Shoes for Cranking Motors	7,241,772	'53 - '67	50%	—	5%	5%	60%	4,345,063
DIESEL EQUIPMENT								
Disc Brake Retaining Bolts	27,559(*)	'68 - '69	50%	—	5%	0%	55%	15,157
Valve Lifter Plunger	402,695	'55 - '58	50%	—	5%	2%	57%	229,536
FISHER BODY-COLUMBUS (Ternstedt)								
Door Lock Striker Pin Blank	1,230,047	'63 - '69	50%	—	5%	3%	58%	713,427
Window Regulator Bearing Stud	462,291	'63 - '66	50%	—	—	1%	51%	235,768
INLAND DIVISION								
Ball Joint Sockets	37,990***	—	50%	—	—	—	50%	18,995
Hydraulic Brake Hose Fittings	113,713	'66 - '69	50%	—	—	2%	52%	59,131

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*Savings before depreciation less 10% estimated depreciation (See PX-A-140e)

**All cleaning at Saginaw; see Defendant's answer to Interrogatory 71 of Sept. 13, 1977

***See Diesel Equipment valve lifter plunger for unit savings after depreciation (PX-A-140d-2)

			Royalty (% of savings)					
Division/Part	**Net Savings After Depreciation (PX-A-140d-1-2)**	**Years**	**Base**	**+ for Strength**	**+ for Cleanability**	**+ for Inflation**	**Total**	**Reasonable Royalty**
NEW DEPARTURE-HYATT								
Inner and Outer Bearing Race	$4,112,982	'57 - '63	50%	—	—	2%	52%	$2,138,751
OLDSMOBILE								
Motor Bodies	2,320***	—	50%	—	—	—	50%	1,160
Ogives	7,288***	—	50%	—	—	—	50%	3,644
Pinions	2,461,127	'65 - '69	50%	—	—	3%	53%	1,304,397
Rear Axle Shafts	5,554,750	'65 - '69	50%	—	—	3%	53%	2,944,018
Sun Gear	128,211(*)	'61	50%	—	5%	0%	55%	70,516
PONTIAC								
Rocket Motor Bodies	1,600***	—	50%	—	—	—	50%	800
SAGINAW STEERING GEAR DIVISION								
Air Pump Rotor	2,269,158(*)	'68 - '69	50%	—	5%**	0%	55%	1,248,037
Bearing Sleeve	126,574(*)	'62 - '69	50%	—	5%	5%	60%	75,944
Cly. Mtg. Ball Stud	29,109(*)	'62 - '69	50%	—	5%	5%	60%	17,465
Intermediate Tubular Shaft	451,427(*)	'67 - '69	50%	5%	—	1%	56%	252,799
Lower Ball Joint Hsg.	2,915,988(*)	'61 - '69	50%	5%	5%	5%	65%	1,895,392
Low Ball Joint Stud	1,239,622(*)	'57 - '69	50%	5%	5%	6%	66%	818,151
Lower Control Arm Shaft	263,813(*)	'61 - '64	50%	5%	5%	1%	61%	160,926

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*Savings before depreciation less 10% estimated depreciation (See PX-A-140e)

**All cleaning at Saginaw; see Defendant's answer to Interrogatory 71 of Sept. 13, 1977.

***See Diesel Equipment valve lifter plunger for unit savings after depreciation (PX-A-140d-2)

			Royalty (% of savings)					
Division/Part	**Net Savings After Depreciation (PX-A-140d-1-2)**	**Years**	**Base**	**+ for Strength**	**+ for Cleanability**	**+ for Inflation**	**Total**	**Reasonable Royalty**
Lower Solid Shaft	285,470(*)	'67 - '69	50%	5%	—	1%	56%	159,863
Lower Tubular Steering Shaft	2,097,899(*)	'67 - '69	50%	5%	—	1%	56%	1,174,823
Manual Worm Blank	760,392(*)	'64 - '69	50%	5%	5%	3%	63%	479,047
Outer Race Blk.	331,962(*)	'66 - '69	50%	—	—	2%	52%	172,620
Pot Coupling	1,281,[illegible]28(*)	'61 - '69	50%	5%	5%	5%	65%	832,993
RVG Worm Blk.	3,835,700(*)	'61 - '69	50%	5%	5%	5%	65%	2,493,205
Steering Gear Solid Shaft	174,181(*)	'67 - '69	50%	5%	—	1%	56%	97,541
Steering Gear Tubular Shaft	296,558(*)	'67 - '69	50%	5%	—	1%	56%	166,072
Upper Ball Joint Hsg.	1,255,911(*)	'61 - '69	50%	5%	—	5%	60%	753,547
Upper Ball Joint Stud	1,040,773(*)	'57 - '69	50%	5%	5%	6%	66%	686,910
Upper Control Arm Shaft	395,330(*)	'64 - '69	50%	5%	—	3%	58%	229,291
U. Joint Bearing	8,714,871(*)	'57 - '69	50%	—	5%	6%	61%	5,316,071
Upper Solid Shaft	2,111,084(*)	'67 - '69	50%	5%	—	1%	56%	1,182,207
TOTAL:								$52,366,372

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*Savings before depreciation less 10% estimated depreciation (See PX-A-140e)

**All cleaning at Saginaw; see Defendant's answer to Interrogatory 71 of Sept. 13, 1977

***See Diesel Equipment valve lifter plunger for unit savings after depreciation (PX-A-140d-2)

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-285-1

PONTIAC MOTOR DIVISION

Model Year	No. of Bumpers	Pounds of Lube	Cost/ Pound	Cost of Lube	Lube Cost/ Bumper
BL-246 Usage Period:					
1956-1959	1,834,407	51,245	$0.23	$11,786	$0.00643
BL-249 Usage Period:					
1959-1963[1]	4,625,241	56,458	$0.24	$13,550	$0.00293
BL-200 Usage Period:					
1964[2]	1,573,604	21,720	$0.28	$ 6,082	$0.00387

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[1] Includes usage of PTD 1239A for approximate 3 months.

[2] Only have figures for 1964 because Pontiac began purchasing precoated stock in 1965.

IN THE U.S. DIST. COURT FOR THE DIST. OF DEL. PLAINTIFFS' ACCOUNTING TRIAL EXHIBIT NO. A-285-2

CHEVROLET DIVISION

Livonia Bumper Plant

Cal. Year	Total Bumpers Made	Pounds of Lube	Cost/ Pound	Total Lube Cost	Cost/ Bumper
BL-215 Usage Period:					
1954-1958	15,180,410	418,500	$0.23	$96,257	$0.00634
KEANS 3833 Usage Period:					
1958-1965	27,882,018	126,940	$0.25	$31,735	$0.00114
MONTGOMERY DA-2481 Usage Period:					
1960-1963 (Primarily 1961)	2,163,336	10,164	$0.20	$ 2,033	$0.00094
BL-200 Usage Period:					
1965-March, 1969	21,244,697	221,000	$0.28	$61,880	$0.00291
BRUNO 27, 27-B Usage Period:					
1965-1966	4,242,412	28,800	$0.182 (ave.)	$ 5,230	$0.00123
					TOTAL

IN THE U.S. DISTRICT COURT FOR THE DISTRICT OF DEL.

Defendant's Accounting Trial Exhibit No. A-33-Tab 49

CHEVROLET - LIVONIA

Lubricant Usage in Pounds for Forming Bumpers

CAL. Year	Soap & Borax		Soap & TKPP	"No Borax"			
	#3833 (Kerns & Pennwalt)	#1047 (Pennwalt)	#200A (Bonderlube)	#215 (Bonderlube)	#2481 (Montomery)	#27 (Bruce)	#243 (Bonderlube)
1954				20,250			
1955				113,400			
1956				104,850			
1957				112,050			
1958	3,105			67,950			
1959	17,338						
1960	18,897				1,848		
1961	12,800	800			6,930		
1962	18,000				462		
1963	24,400				924		
1964	29,200		260				
1965	2,400		18,980			21,400	
1966			57,200			7,400	

1967		54,860	
1968		74,620	
1969	9,450	74,880	
1970	9,308	33,020	
1971	18,416	119,080	
1972	78,462	77,220	
1973	120,000		70,000
1974	40,000		39,000
1975	32,000		18,200
1976	90,000		23,400
1977	132,400		
1978	117,340 (To JULY)		

IN THE U.S. DIST. COURT
FOR THE DIST. OF DEL.
[TITLE OMITTED IN PRINTING]

GM'S PROPOSED FINDINGS OF FACT

K. Reasonable Royalties in General

K-1

* * *

The statute applicable to recoveries for patent infringement is 35 USC 284. It provides for an award of "damages not less than a reasonable royalty". The question here is primarily "had General Motors not infringed, what would Plaintiffs have made?"[1] Plaintiffs have not used the patent process. Their only damage is the amount of reasonable royalty they would have collected under a license for processes that infringe.[2] The only thing that General Motors did not do that it should have done was to negotiate a license for such processes.[3] The parties agree that the amount of the reasonable royalty in this case is a fractional part of the monetary worth of the benefits of the patent process in relation to alternative processes outside the patent. Plaintiffs' contend that a general license should be considered to be negotiated in 1952. General Motors contends that the appropriate date for a general license is late 1955. The parties agree that the general license to be negotiated should cover all future use of processes within the patent.

* * *

[Certificate of Service omitted in Printing]

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[1] Tr 1977-9 (Church)

[2] Tr 1904, 1981 (Church)

[3] Tr 1982; 1985-6 (Church).

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, et al.,
Plaintiffs,
v.
GENERAL MOTORS CORPORATION,
Defendant.

Civil Action No. 3058
STIPULATION

IT IS HEREBY STIPULATED by and between the parties that (a) the method and numbers utilized in calculating the amount of the reasonable royalty and prejudgment interest for inclusion in the final judgment based on Judge Wright's Opinion dated August 22, 1980 are set forth in the attached letter dated September 25, 1980, and (b) said letter and this Stipulation are to be deemed part of the record.

Dated: September 29, 1980

POTTER, ANDERSON & CORROON

By /s/ DAVID F. ANDERSON

Attorneys for Plaintiffs
350 Delaware Trust Building
Wilmington, Delaware 19899

CONNOLLY, BOVE & LODGE

By /s/ HAROLD PEZZNER

Attorneys for Defendant
1800 Farmers Bank Building
Wilmington, Delaware 19899

SO ORDERED this 18th day of October, 1980

/s/ CALEB M. WRIGHT

U.S.D.J.

Leventritt Lewittes & Bender
Attorneys
25 Broadway
New York, N.Y. 10004

September 25, 1980

George Frost, Esq.
Director of Patents
General Motors Corporation
General Motors Building
3044 West Grand Blvd.
Detroit, Michigan 48202

Re: *Devex v. GM*

Dear George:

This letter is intended to place on the record the method and numbers utilized in calculating the amount of the reasonable royalty and interest down to the date of judgment based on Judge Wright's opinion dated August 22, 1980:

1. The calculation of the amount of the reasonable royalty follows:

(i) The sales value for bumper infringement (based on GM's selling prices to its dealers) is as follows:

Chevrolet	$1,229,261,074
Pontiac	734,825,497
Cadillac	383,432,487
Oldsmobile (practice 43)	60,211,626
Fisher-Body Elyria	40,587,523
Total	$2,448,318,207

(ii) Applying 48% (from Judge Wright's opinion) to the sales value of $2,448,318,207 results in a net sales value in the amount of $1,175,192,739.

(iii) The reasonable royalty rate of .75% is applied to the net sales value of $1,175,192,739 which results in a reasonable royalty of $8,813,945.50.

2. Reasonable Royalty On Bumpers For Each Group By Years

Year	Group A	Group C	Group D	Total
1956	$ 75,066.15			$ 75,066.15
1957	166,249.80			166,249.80
1958	218,920.95			218,920.95
1959	559,268.25			559,268.25
1960	552,081.45			552,081.45
1961	328,440.00			328,440.00
1962	791,263.35	$109,937.55		901,200.90
1963	855,189.15	106,824.30		962,013.45
1964	483,343.20		$ 428,992.20	912,335.40
1965	32,923.50		774,835.20	807,758.70
1966			825,758.55	825,758.55
1967			963,722.85	963,722.85
1968			1,048,901.50	1,048,901.50
1969			492,227.55	492,227.55
Total	$4,062,745.80	$216,761.85	$4,534,437.85	$8,813,945.50[*]

3. To calculate interest, we start with the accumulated simple interest rate to 12/31/78 (App. 1 attached hereto). Interest for the year 1979 is 10.12% (App. 2 attached hereto). Interest for the period 1/1/80 to 8/31/80 is 8.29%. 8.29% represents two-thirds (1/1/80 - 8/31/80) of 12.43% which is the average of Moody's Corporate Bond Annual Yield Composite Average for the first eight months of 1980 as follows (App. 3 -App. 7, attached hereto):

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[*] An alternative computation from the record data leads to a total that differs only by 7¢ from the stipulated total of $8,813,945.50.

Note: Group A - soap and borax lubricant
Group C - accused practice 43
Group D - soap and TKPP lubricant

January	11.74%
February	12.92
March	13.73
April	13.21
May	12.11
June	11.64
July	11.77
August	12.33
Total	99.45%
Average	12.43%

4. The daily average corporate bond yield during September 1980 (App. 7-App. 9, attached hereto) is as follows:

9/2	12.66%	9/11	12.69
9/3	12.65	9/12	12.71
9/4	12.64	9/15	12.73
9/5	12.71	9/16	12.77
9/8	12.72	9/17	12.82
9/9	12.72	9/18	12.82
9/10	12.70		
		Total	165.34%
		Average	12.7184%

To compute interest on a daily basis for the month of September of 1980 we first take the average annual rate of 12.71846% for the first 18 days of September (set forth above) and divide that annual rate by 365 to get the *daily* rate of .034845%. Applying .034845% to the reasonable royalty of $8,813,945.50 is $3,071.22; this is the daily interest charge during September for each day up to and including the day judgment is entered.

5. Interest % at Stipulated Commercial Rates on the Reasonable Royalty

Year	Accumulated Simple Interest Rate to 12/31/79	Accumulated Simple Interest Rate to 8/31/80 (By Adding 8.29%)
1952	166.28%	174.57%
1953	162.85	171.14
1954	159.69	167.98
1955	156.44	164.73
1956	152.87	161.16
1957	148.66	156.95
1958	144.50	152.79
1959	139.85	148.14
1960	135.12	143.41
1961	130.46	138.75
1962	125.84	134.13
1963	121.34	129.63
1964	116.76	125.05
1965	112.13	120.42
1966	106.79	115.08
1967	100.97	109.26
1968	94.46	102.75
1969	87.10	95.39

6. Interest Accrued By Year of Use of Infringing Practices

Year	Reasonable Royalty on Bumpers	Accumulated Simple Interest Rate to 8/31/80	Dollar Amount of Accumulated Simple Interest to 8/31/80
1956	$ 75,066.15	161.16%	$ 120,976.60
1957	166,249.80	156.95	260,929.06
1958	218,920.95	152.79	334,489.31
1959	559,268.25	148.14	828,499.98
1960	552,081.45	143.41	791,740.00
1961	328,440.00	138.75	455,710.50

1962	901,200.90	134.13	1,208,780.70
1963	962,013.45	129.63	1,247,058.00
1964	912,335.40	125.05	1,140,875.40
1965	807,758.70	120.42	972,703.02
1966	825,758.55	115.08	950,282.93
1967	963,722.85	109.26	1,052,963.50
1968	1,048,901.50	102.75	1,077,746.20
1969	492,227.55	95.39	469,535.85
		Total	$10,912,291.05*

7. A summary is:

Reasonable Royalty -	$ 8,813,945.50
Interest to 8/31/80** -	10,912,291.05
Total	$19,726,236.55

Sincerely,

/s/ SIDNEY BENDER

SB:dr

cc: David F. Anderson, Esq.
Arthur G. Connolly, Esq.
Frederick B. Ziesenheim, Esq.
William C. McCoy, Jr., Esq.
Lynn Alstadt, Esq.

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*An alternative computation from the record data leads to a total that differs only by 40¢ from the stipulated total of $10,912,291.05.

**Interest of $3,071.22 *per day* should be added (to the interest to 8/31/80) up to and including the day judgment is entered.

APPENDIX

INTEREST AT STIPULATED COMMERCIAL RATES ON THE REASONABLE ROYALTY

Year for Which Reasonable Royalty Granted	Accumulated Simple Interest Rate to 12/31/78	Accumulated Simple Interest Rate to 12/31/79
1952	156.16%	166.28%
1953	152.73	162.85
1954	149.57	159.69
1955	146.32	156.44
1956	142.75	152.87
1957	138.54	148.66
1958	134.38	144.50
1959	129.73	139.85
1960	125.00	135.12
1961	120.34	130.46
1962	115.72	125.84
1963	111.22	121.34
1964	106.64	116.76
1965	102.01	112.13
1966	96.67	106.79
1967	90.85	100.97
1968	84.34	94.46
1969	76.98	87.10

IN THE U.S. DISTRICT COURT
FOR THE DISTRICT OF DELAWARE
Defendant's Accounting Trial
Exhibit No. A-33, item 27

A 4609

Def-A-33

Prf 3101 4-5 12-1 2001 NUK URS LPE BON DUT

MODELS (RPO-34-35-3700) 3600-3800
Rear 3105-6-16-3805 (RPO-3112) & Service

PART NO. 3744766

PART NAME Bumper Face Bar

DATE Sept. 1, 1957 ISSUE NO. 1 NO. OF SHEETS 2 SHEET NO. 1 BOOK NO. 3474

OPER. NO.	OPERATIONS	DEPT.	NO. MEN	[illegible]	[illegible]	STANDARDS			STD. HOURS	TOTAL STD. HOURS
						CYCLE	HOURLY	SHIFT		
	Supersedes #3713797									
	.149" + .010" x 21" High Tensil Hot Rolled Steel-SAE-950									
	89" Makes 2 Bars									
	Wgt: 40.3749# (.9073# Per Inch)									
10	Load Pickle Machine	40	2	2	R-217	2238	2002	1978	.0010	
10	Unload Pickle Machine		1	3	R-218	2316	2184	2166	.00045	
	Contingencies (1725/Hr.)								.00025	
	Flat Stock Pickle Machine,M354									
20	Load Flat Polish Machine		1	4	R-383	831	790	726	.0014	
20	Belt Changers		2	5	Est.			726	.0028	
20	Unload Flat Polishing Machine		2	6	Est.			726	.0028	
	Murray-Way Micro-Polish Lines,M-221,222									
	Contingencies (630/Hr.)								.0009	
	Relief								.0007	
	7½% Allowance for Reruns								.0006	
										.0109
30	Draw (2)	41	1	7	R-229	484	474	473	.0021	
	Verson Press C2-2500-156-66T,M-5081,5211									
40	Trim Ends & Part		3	18	R-230	387	380	380	.0079	
	Verson Press C2-800-132-60T,M-5084									
50	Restrike Bottom Edge		2	20	R-115	375	375	371	.0054	
	Verson Press C2-800-132-60T,M-5082									
60	Trim Top Edge (Load)		1	10	R-226	375	356	355	.0028	
60	Trim Top Edge (Unload)		1	10	R-227	375	356	355	.0028	
	Verson Press C2-800-132-60T-M-5083									
70	Pierce Holes		1	19	Est.			325	.0031	
	Hydraulic Pierce Press,M-5546									
80	Deburr Top Edge		1	21	R-219	335	332	332	.0030	
80	Deburr Ends & Bottom Edge		1	21	R-220	336	333	333	.0030	
	Deburring Conveyor M-5238									
90	Load Washing Machine		1	32	R-221	746	642	642	.0016	
90	Unload Washing Machine & Palletize		2	32	R-180	349	325	325	.0062	
	Chain Conveyor Washing Machine,M-4268									
	Continued on Sheet #2									

8-8-57

APPROVED

MODELS Front 3102-3-4-5-6-12-16-3200- (RPO-34-35-3700) 3600-3800 Rear 3105-6-16-3805 (RPO-3112) & Service

MANUFACTURING OPERATIONS ROUTING

PART NO. 3744366

PART NAME Bumper Face Bar

DATE Sept. 1, 1957 ISSUE NO. 1 NO. OF SHEETS 2 SHEET NO. 2 BOOK NO. 3474

OPER. NO.	OPERATIONS	DEPT.	NO. MEN	CODE NO.	EQ. NO.	STANDARDS CYCLIC	HOURLY	SHIFT	STD. HOURS	TOTAL STD. HOURS
	Relief Men	41			Est.				.0044	
	Job Setters				Est.				.0067	
	Line Balance (325/Hr.)								.0052	
	Contingencies (225/Hr.)								.0191	
										.0733
100	Hand Polish Complete	42	2	31	Est.					.0089
	Polishing Jacks									
		Dept	40		Dept.41		Dept.42			
	TOTAL STANDARD TIME PER BAR		.0109		.0733		.0089			.0931
	Shipping Wgt: 30.5#									
	NewRouting									

A 4610

679a

IN THE U.S. DISTRICT COURT
FOR THE DISTRICT OF DELAWARE
Defendant's Accounting Trial
Exhibit No. A-33, item 28

MODELS 3102-3-4-5-6-12-16-3200-3600-3800.
(RPO-3442-3542-3742
Rear 3105-6-16-3805 (RPO-3112) & Service
PART NO. 3744766
PART NAME Bumper Face Bar
DATE May 1, 1958 ISSUE NO. 2 NO. OF SHEETS 2 SHEET NO. 1 ROUTE NO. 4089

OPER. NO.	OPERATIONS	DEPT.	NO. MEN	CODE NO.	ROS. NO.	STANDARDS CYCLE	HOURLY	SHIFT	STD. HOURS	TOTAL STD. HOURS
	.149" ± .010" x 21" High Tensil Hot Rolled Steel - SAE - 950									
	89" Makes 2 Bars									
	Wgt: 40.3749# (.9073# Per Inch)									
10	Load Pickle Machine	40	2		R-217	2238	2002	1978	.0010	
10	Unload Pickle Machine		1		R-218	2316	2184	2166	.00045	
	Contingencies (1370/Hr)								.00075	
	Flat Stock Pickle Machine, M-354									
20	Load Flat Polish Machine		1		R-383	831	790	726	.0014	
20	Belt Changers		2		Est.			726	.0028	
20	Unload Flat Polishing Machine		2		Est.			726	.0028	
	Murray-Way Micro-Polish Lines, M-221-222, 5839								.0022	
	Contingencies (545/Hr)								.0008	
	Relief								.0007	
	7% Allowance for Re-Runs									.0129
30	Draw (2)	41	1		R-229	486	476	473	.0021	
	Verson Press C2-2500-156-66P, M-5081-5211									
40	Trim Ends & Part		1		R-230	387	380	380	.0079	
	Verson Press C2-800-132-60P, M-5084									
50	Restrike Bottom Edge		2		R-115	375	375	371	.0054	A 4811
	Verson Press C2-800-132-60P, M-5082									
60	Trim Top Edge (Load)		1		R-226	375	356	355	.0028	
60	Trim Top Edge (Unload)		1		R-227	375	356	355	.0028	
	Verson Press C2-800-132-60P, M-5083									
80	Deburr Top Edge		1		R-219	335	332	332	.0030	
80	Deburr Ends & Bottom Edge		1		R-220	336	333	333	.0030	
	Deburring Conveyor, M-5238									
90	Pierce Holes & Load Washing Machine		2		R-425	524	463	463	.0043	
	Hydraulic Pierce Press, M-5546									
90	Unload washing machine & palletize		2		R-180	349	325	325	.0062	
	Chain Conveyor Washing Machine, M-4968									
	Continued on sheet #2									

ISSUED TO ROUTE April 21, 1958 APPROVED

MODELS 3102-3-4-5-6-12-16-3200-3600-3800 (RPO-3442-3542-3742)
Bear 3105-6-16-3805 (RPO 3112) & Service

PART NO. 3744766

PART NAME Bumper Face Bar

DATE May 1, 1958 ISSUE NO. 2 NO. OF SHEETS 2 SHEET NO. 2 BOOK NO. 4029

OPR. NO.	OPERATIONS	DEPT.	NO. MEN	COST NO.	MCH. NO.	STANDARDS CYCLES	HOURLY	SHIFT	STD. HOURS	TOTAL STD. HOURS
	Relief Men	41							.0048	
	Job Setters								.0071	
	Line Balance (325/Hr)								.0056	
	Contingencies (210/Hr)								.0236	
										.0786
100	Hand Touch-Up 1%	42							.0002	.0002
	Polishing Jacks									
		Dept 40			Dept 41		Dept 42			
	TOTAL STANDARD TIME PER BAR	.0129			.0786		.0002			.0917
	Shipping Wgt: 30.5#									
	#4029 Supersedes #3474									

ISSUE TO BOOKS April 23, 1958

A 4612

681a

IN THE U.S. DISTRICT COURT
FOR THE DISTRICT OF DELAWARE
Defendant's Accounting Trial
Exhibit No. A-33, item 29

MODELS ' RPO P2342-2542-2642-3342-3542-3642 & Service PART NO. 3744766

PART NAME Front Bumper Face Bar

DATE August 1, 1959 ISSUE NO. 3 NO. OF SHEETS 2 SHEET NO. 1 BOOK NO. 5151

SEQ. NO.	OPERATIONS	DEPT.	NO. MEN	CODE NO.	REQ. NO.	STANDARDS CYCLE	HOURLY	SHIFT	STD. HOURS	TOTAL STD. HOURS
	.147" x .009" x 21" High Tensil Hot Rolled Steel - SAE-950									
	59" Makes 2 Bars									
	Wgt: 39.5917# (.8897# Per Inch)									
10	Load Pickle Machine	40	2		R-217	2238	2002	1978	.0010	
10	Unload Pickle Machine		1		R-218	2316	2184	2166	.00045	
	Contingencies (1375/Hr)								.00075	
	Flat Stock Pickle Machine H-354									
20	Load Flat Polish Machine		1		R-383	831	790	726	.0014	
20	Belt Changers		2		Est.			726	.0028	
25	Unload Flat Polishing Machine		1		Est.			726	.0014	
	Murray-Way Micro-Polish Lines, H-221,222,5599								.0009	
	Contingencies (615/Hr)								.0016	
	Inspection								.0007	
	Relief								.0023	
	Bonder-lube Operators		2						.0010	.0143
	10% Allowance for Re-Runs									
30	Draw (2)	41	1		R-299	484	474	473	.0021	
	Verson Press C2-2500-156-66T, H-5081,5211									
40	Trim Ends & Part		2		Est.			175	.0114	A
	Verson Press C2-800-132-60T, H-5084									
50	Restrike Bottom Edge		1		Est.			175	.0057	
	Verson Press C2-800-132-60T, H-5082									
60	Trim Top Edge (Load)		1		R-226	375	356	355	.0028	
60	Trim Top Edge (Unload)		1		Est.			355	.0028	
	Verson Press C2-800-132-60T, H-5083									
80	Deburr		3		Est.			175	.0171	
	Deburring Conveyor, H-5238									
90	Pierce Holes & Load Washing Machine		2		R-425	524	463	463	.0043	
	Hydraulic Pierce Press, H-5546									
90	Unload Washing Machine & Palletize		2		R-380	349	325	325	.0062	
	Chain Conveyor Washing Machine, H-4968									
	Continued on sheet #2									

ISSUE TO BOOKS 7-30-59 APPROVED

M.....s P2 254 42- -35 64 Ser Pl... No. 847

PART NAME Front Bumper Face Bar

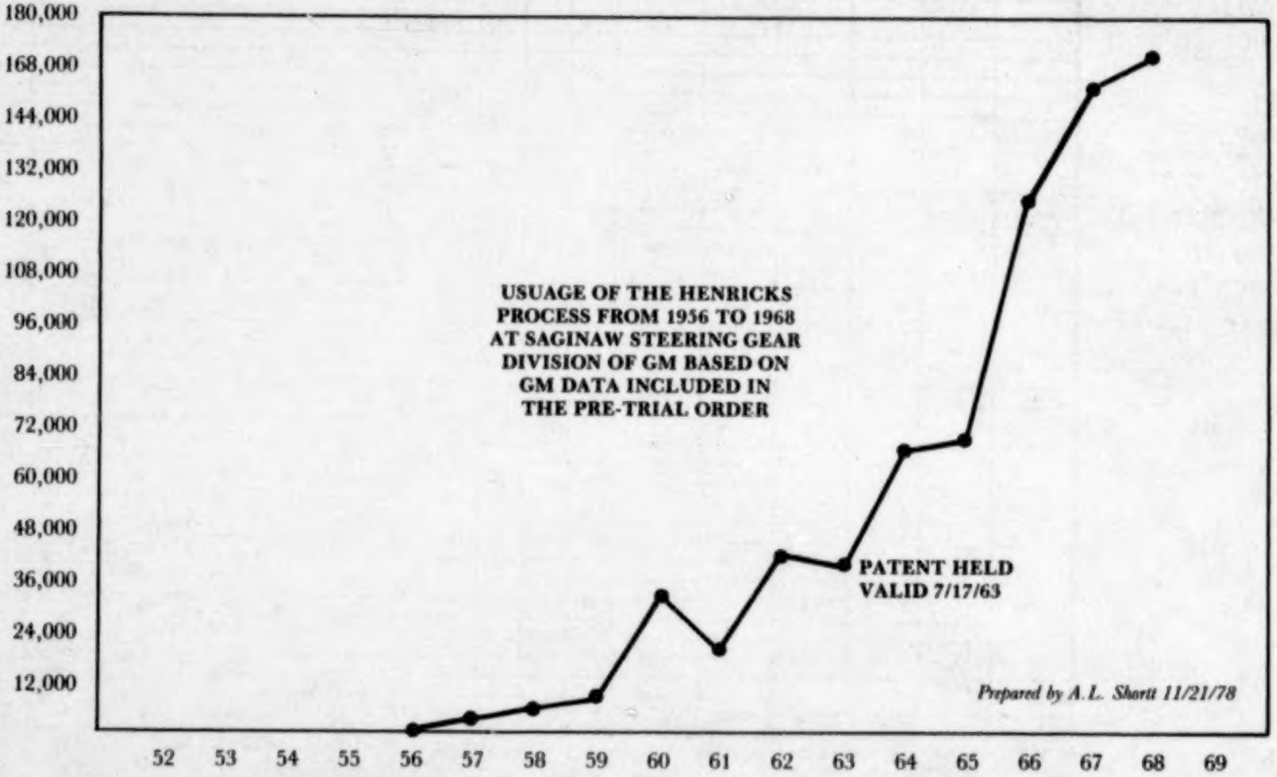
DATE August 1, 1959 ISSUE NO. 3 NO. OF SHEETS 2 SHEET NO. 2 BOOK NO. 5151

[illegible]	OPERATIONS	DEPT.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	STD. HOURS	TOTAL STD. HOURS
	Inspection	41							.0029	
	Relief Man								.0057	
	Job Setters								.0056	
	Line Balance (325/Hr)								.0033	
	Contingencies (175/Hr)								.0185	.0914
100	Hand Touch-Up 1%	42							.0002	
	Polishing jacks									.0002
		Dept 40			Dept 41		Dept 42			
	TOTAL STANDARD TIME PER BAR	.0143			.0914		.0002			.1059
	Shipping Wgt: 30.5#									
	#5151 Supersedes #4029									

ISSUE TO BOOKS: 7-30-59

683a

IN THE U.S. DIST. COURT FOR THE DIST. OF DEL.
PLAINTIFFS' ACCOUNTING TRIAL
EXHIBIT NO. A-146B-1


USAGE OF THE HENRICKS PROCESS FROM 1956 TO 1968 AT SAGINAW STEERING GEAR DIVISION OF GM BASED ON GM DATA INCLUDED IN THE PRE-TRIAL ORDER

Prepared by A. L. Shortt 11/21/78

IN THE U.S. DISTRICT COURT FOR THE DISTRICT OF DELAWARE
PLAINTIFFS ACCOUNTING TRIAL EXHIBIT NO. A-147

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

CONSUMER PRICE INDEX FOR ALL URBAN CONSUMERS (REVISED CPI-U)

U.S. CITY AVERAGE

ALL ITEMS — SERIES A

(1967 — 100)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	AVG.
1946	54.5	54.3	54.7	55.0	55.3	55.9	59.2	60.5	61.2	62.4	63.9	64.4	58.5
1947	64.4	64.3	65.7	65.7	65.5	66.0	66.6	67.3	68.9	68.9	69.3	70.2	66.9
1948	71.0	70.4	70.2	71.2	71.7	72.2	73.1	73.4	73.4	73.1	72.6	72.1	72.1
1949	72.0	71.2	71.4	71.5	71.4	71.5	71.0	71.2	71.5	71.1	71.2	70.8	71.4
1950	70.5	70.3	70.6	70.7	71.0	71.4	72.1	72.7	73.2	73.6	73.9	74.9	72.1
1951	76.1	77.0	77.3	77.4	77.7	77.6	77.7	77.7	78.2	78.6	79.0	79.3	77.8
1952	79.3	78.8	78.8	79.1	79.2	79.4	80.0	80.1	80.0	80.1	80.1	80.0	79.5
1953	79.8	79.4	79.6	79.7	79.9	80.2	80.4	80.6	80.7	80.9	80.6	80.5	80.1
1954	80.7	80.6	80.5	80.3	80.4	80.7	80.7	80.6	80.4	80.2	80.3	80.1	80.5
1955	80.1	80.1	80.1	80.1	80.1	80.1	80.4	80.2	80.5	80.5	80.6	80.4	80.2

1956	80.3	80.3	80.4	80.5	80.9	81.9	82.0	81.4	82.0	82.5	82.5	82.7	81.4
1957	82.8	83.1	83.3	83.6	83.8	84.3	84.7	84.9	84.9	84.9	85.2	85.2	84.3
1958	85.7	85.8	86.4	86.6	86.6	86.7	86.0	86.7	86.7	86.7	86.8	86.7	86.6
1959	86.8	86.7	86.7	86.8	86.9	87.3	87.5	87.4	87.7	88.0	88.0	88.0	87.3
1960	87.9	88.0	88.0	88.5	88.5	88.7	88.7	88.7	88.8	89.2	89.3	89.3	88.7
1961	89.3	89.3	89.3	89.3	89.3	89.4	89.8	89.7	89.9	89.9	89.9	89.9	89.6
1962	89.9	90.1	90.3	90.5	90.5	90.5	90.7	90.7	91.2	91.1	91.1	91.0	90.6
1963	91.1	91.2	91.3	91.3	91.3	91.7	92.1	92.1	92.1	92.2	92.3	92.5	91.7
1964	92.6	92.5	92.6	92.7	92.7	92.9	93.1	93.0	93.2	93.3	93.5	93.6	92.9
1965	93.6	93.6	93.7	94.0	94.2	94.7	94.0	94.6	94.8	94.9	95.1	95.4	94.5
1966	95.4	96.0	96.3	96.7	96.8	97.1	97.4	97.9	98.1	98.5	98.5	98.6	97.2
1967	98.6	98.7	98.9	99.1	99.4	99.7	100.2	100.5	100.7	101.0	101.3	101.6	100.0
1968	102.0	102.3	102.8	103.1	103.4	104.0	104.5	104.8	105.1	105.7	106.1	106.4	104.2
1969	106.7	107.1	108.0	108.7	109.0	109.7	110.2	110.7	111.2	111.8	112.2	112.9	109.8
1970	113.3	113.9	114.5	115.2	115.7	116.3	116.7	116.9	117.5	118.1	118.5	119.1	116.3
1971	119.2	119.4	119.8	120.2	120.8	121.5	121.8	122.1	122.2	122.4	122.6	123.1	121.3
1972	123.2	123.8	124.0	124.3	124.7	125.0	125.5	125.7	126.2	126.6	126.9	127.3	125.3
1973	127.7	128.6	129.8	130.7	131.5	132.4	132.7	135.1	135.5	136.6	137.6	139.5	133.1
1974	139.7	141.5	143.1	143.9	145.5	146.9	148.0	149.9	151.7	153.0	154.3	155.4	147.7
1975	156.1	157.2	157.8	158.6	159.3	160.6	162.3	162.8	163.6	164.6	165.6	166.3	161.2
1976	166.7	167.1	167.5	168.2	169.2	170.1	171.1	171.9	172.6	173.3	173.8	174.3	170.5
1977	175.3	177.1	178.2	179.6	180.6	181.8	182.6	183.3	184.0	184.5	185.4	186.1	181.5
1978	187.2	188.4	189.8	191.5									
1979													

IN THE U.S. DISTRICT COURT FOR THE DISTRICT OF DELAWARE
PLAINTIFFS' ACCOUNTING TRIAL EXHIBIT NO. A-275

CHEVROLET MOTOR DIVISION

SPRING & BUMPER PLANT

Analysis of Bumper Burden Center Requested Standard Labor

New Part	Superseded Part Number	1960 Req.	1959 March Actual Cost	(1) Increase (Ped)	(2) Change In Design +	(3) Annual Improv. +	(4) Other -	(1) Code
3757577		.0192		.0192			.0192	A
3757578		.0192		.0192			.0192	A
3757638	3751508	.1560	.2482	.0922	.0961	.0039		
3760985	3750845	.2579	.2530	.0049	.0015	.0064		
3760986	3750846	.2579	.2530	.0049	.0015	.0064		
3760987	3750844	.2472	.2432	.0040	.0022	.0062		
3761466	3744766	.1582	.1926	.0344	.0384	.0040		
3761524		.0288		.0288			.0288	A
3762259		.1582		.1582			.1582	A
3763780		.7458		.7458	A			
3763785	3751717	.7436	.4027	.3409		.0186	.3223	B
3763786	3744767	.7458	.2005	.5453		.0186	.5267	B
3765010	3750844	.3741	.2432	.1309		.0093	.1216	C
3765015	3756937	.2675	.2613	.0062	.0005	.0067		
3765016	3756938	.2675		.0062	.0005	.0067		
3765472		.0415		.0415			.0415	A

3766845	3714646	.8684	.2073	.6611		.0217	.8394	B
3767100	3715875	.2808	.1993	.0815	.0745	.0070		
3767984	3750849-50	.3626	.2592	.1034	.0944	.0090		E
3767985	3750849	.2862	.2595	.0270	.0199	.0071		E
3767986	3750850	.2862	.2592	.0270	.0199	.0071		E
3768329	3754854	.0454	.0416	.0038	.0027	.0011		
6255799		.5570		.5570			.5570	A
6255800		.5570		.5570			.5570	A
3744766		.2539	.1926	.0613		.0055	.0558	D

Code:

A	New Part
B	Plated by outside source in 1959 — To be plated by our plant in 1960
C	Less Volume — Requires Hand Buffing (Station Wagon)
D	Production Reduced by 85%
E	Three Piece Bumper replacing two piece

CHEVROLET MOTOR DIVISION

SPRING & BUMPER PLANT

Analysis of Bumper Center Requested Standard Labor

Developed 1960 Std. Vol. Schedule I(h)	**Developed at March Actual Cost**	**Increase of 1960 Std. Labor**	**Analysis of Increase**
	1960 Std. Vol.		
2,632,316	2,071,131	561,185	(1) 139,445
			(2) 53,084
			(3) 311,797
			(4) 26,907
			(5) 29,857
			(6) 95
			561,185

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(1) The additional money requested due to design is allocated to the three piece bumper over the two piece or — $154,035. The difference between the 139,445 and 154,035, reflects a reduction in money due to change in design of the remaining.

(2) The annual improvement can be determined by multiplying the wage adjustment as shown on the J(g) schedules by Standard Volume.

(3) New parts can be determined by multiplying Standard Volume by requested Standard Labor. Refer to the I(g) Schedules. (Holden included)

(4) Plated by an outside source in 1959, to be plated at this location in 1960 — Refer our letter of May 27, 1959.

(5) Reduction in volume — Refer to above letter.

(6) Production reduced by 85% — Refer to I(g) Schedules.

LETTER DATED OCTOBER 10, 1974 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex v. General Motors*

Gentlemen:

A tickler to my calendar for this week reminds that it has been just six months since I met with you (along with your correspondents, Messrs. Blenko, Ziesenheim, Hibben and Frost) to discuss the course which it was expected this matter would take. I know from reviewing the documents as they are filed with me that discovery is proceeding in an orderly way. And I am assuming, since only one matter has been submitted for decision, that such disagreements as may arise in the discovery process are generally being resolved in an amicable way.

Although acutely aware that well-represented adversaries require no judicial (or quasi-judicial) superintendence, I remain sensitive to the requirement of Rule 53(d)(1) that: "It is the duty of the master to proceed with all reasonable diligence." Mindful of this duty it is suggested that a time be arranged at which I might be advised, at least in a broad way, as to what yet remains to be done to ready this matter for hearing. At the same time each side will be invited to indicate whether it thinks discovery is far enough along now to consider setting the matter down.

Please let me have a couple of dates which suit your joint convenience so that we can arrange to get together, hopefully within the next two or three weeks.

Very truly yours,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:lm

LETTER DATED NOVEMBER 4, 1975 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex Corporation, et al., v. General Motors Corporation - C. A. No. 3058*

Gentlemen:

This is in follow up to our conference of Friday last, also attended by Messrs. Frost and Hibben for defendant and Messrs. Blenko, Ziesenheim and Shortt for plaintiffs. At the conclusion of our meeting I undertook to set down my views of where we stand on the application to compel production.

* * *

To review, on July 28, 1975, plaintiffs moved to compel production of certain documents which had been the object of a Rule 34 request filed April 14, 1974. An answering brief was filed July 28, 1975, and a reply filed October 17, 1975. The motion and briefs had annexed to them various attachments.

The gist of the controversy centers around the production of "burden" figures. As the master understands it, burden is a multiplier applied by defendant to labor cost to formularize, in combination with cost of materials, manufactured cost. So defendant's estimate of manufactured cost seems to consist of labor cost times burden plus cost of material.

It would appear that savings-in-cost as the result of an allegedly infringing use of the patented process is at least arguably material to a reasonable royalty determination. Indeed, the master did not understand defendant to differ from this proposition. At the hearing, without conceding the issue of materiality, defendant itself agreed to supply burden figures in those instances in which the charged use resulted in a labor saving.

The issue thus narrowed itself to whether burden figures should be made available where no labor saving is demonstrable. On this point the parties had a different view of the facts. Plaintiffs contended that the burden multiplier included possible indirect savings stemming from use of the patented process, including such possible items as space savings, reduced energy needs, etc. With the facts so posed, they indicated that equipped with burden figures they hoped to succeed in breaking out of the overall burden multiplier those components attributable to the infringing use. By so doing they could compare the indirect cost incident to the allegedly infringing use with the indirect costs incurred without infringement. The comparison might yield a savings in cost even absent a direct savings either in labor or material. The master certainly cannot at this stage say that such evidence, were it developed, would be valueless in determining the reasonable royalty issue.

Defendant for its part saw the facts differently. It represented that the multiplier labeled "burden" was largely arbitrary, and consisted of so many factors unrelated to the allegedly infringing process (expense of running a proving ground, home office salaries, etc.), and inseparable as a practical matter from any arguable indirect savings, that the burden could not in itself be expected to lead to evidence of saved costs. Believing the burden information to be highly confidential, and of no arguable materiality except where applied to a savings in labor, defendant resisted plaintiffs' request to coy them.

At the hearing the master suggested that the burden figures should be made available for copying since plaintiffs have made at least a *prima facie* showing that such will lead to evidence of indirect savings as the result of defendant's alleged infringement. However, in light of the defendant's view of the uselessness of the burden figures, and to at least partly accommodate defendant's concern about secrecy, the master suggested that burden data for relatively early time periods (perhaps close to the beginning of the infringement) be produced by defendant. The sensitivity of defendant to disclosure of this information (already in part seen, but not copied by plaintiffs) will thus be mitigated. To the extent necessary, confidentiality agreements may be required.

If plaintiffs are satisfied that the burden figures (contrary to their present expectation) are not likely to lead to evidence of cost savings after analyzing the data produced, presumably they will go no further. Conversely if defendant, after further review of the burden data becomes satisfied that such information does in fact provide a guide toward proof of indirect savings, it is expected that it will consider voluntarily furnishing all such requested data on a confidential basis without the need for plaintiffs to press their motion.

For now, the master views the motion to compel as tabled. However, in light of the master's thoughts as expressed at the hearing and set down here, the dispute will be susceptible of resolution in the lawyerlike spirit which has characterized the parties' dealings in the extensive discovery conducted to date. If the parties are unable to resolve their differences with the guidance supplied, the pending motion may be activated. It will then be decided.

Very truly yours,

/s/ ______________________

Bruce M. Stargatt

BMS: jv

cc: Evan L. Barney, Clerk

LETTER DATED MARCH 25, 1976 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex Corporation, et al., v. General Motors Corporation — C.A. No. 3058*

Gentlemen:

The last session to consider the status of the above matter was held the end of last October. It is suggested that we meet again during the week of April 26. I would nominate, for no special reason, April 30 at 11:00 a.m. (If either side would prefer a day earlier in the week, and/or a different hour, I am sure it can be arranged.)

By way of agenda, the following will be considered:

1. *Review of discovery to date* — Although I do review the various discovery documents as they are filed, it would be useful to have a cohesive report as to what has been done over the six months past. I found the listing of depositions provided by plaintiffs at the last conference most helpful on this point. It would be enough to simply update it, supplementing the presentation by adding other discovery such as interrogatories and production. Defendant is invited to supply its own summary should it believe such would be of assistance to the Master.

2. *Open discovery* — At the October hearing both sides called attention to discovery documents filed but not complied with for various reasons. It would be time-saving if discovery in this posture could be isolated in written form by way of summary for separate discussion. Each side should concentrate on its own unanswered discovery requests in preparing such summary.

3. *Further discovery* — As part of their October status report plaintiffs did outline planned future discovery. I would like for this to be supplemented, and for defendant to reduce to writing its projected discovery.

4. *Discovery cut-off date and trial date* — My notes indicate that it was plaintiffs' expectation in October that its discovery would be complete in a year, and that trial might be had six months thereafter. Defendant expressed the view that this estimate seemed realistic. If the predictions are on target, discovery should be complete by the end of this coming October, and trial should be had next April or so. It is hoped that we will now be in a position to set firm dates.

* * *

I think it would be productive if the parties furnish each other and the Master with copies of such written materials as they will be filing three days before the conference. I also should make it plain that the summaries and reports invited need take no particular form, their design being to help me keep a handle on where the case is going and to identify any problem areas. Finally, the agenda listing is not designed to be in any way restrictive. If there are items not covered on the list which either side thinks need to be raised, they will be discussed and considered at the conference. To the extent possible, however, I do think it would be desirable that a party seeking to raise a matter not covered by the agenda furnish a written statement, to me and its opponent, covering the point it wishes to make at least three days before the conference.

* * *

After you have had time to discuss between yourselves and with your correspondents the suggested meeting date, I look forward to hearing from you so arrangements may be made firm.

Sincerely,

/s/ ______________________

Bruce M. Stargatt

BMS: jv

LETTER DATED SEPTEMBER 23, 1976 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex, et al., v. General Motors*

Gentlemen:

This will serve as a tentative agenda for our October 12 meeting:

(1) *Review of discovery to date* — This should be in written form and can take the shape of supplementing the helpful presentations which were made prior to the conference we had on April 29.

(2) *Open discovery and further discovery* — As at our April meeting, it would be useful for each side to isolate those of its own discovery requests which remain open. It will also be expected that future discovery which needs yet to be initiated will be outlined and discussed. It would be helpful if this also could be done in writing.

(3) *Hearing date* — The viability of the May 2, 1977 hearing date will be considered in light of the progress being made in discovery, and of the special problems outlined by Mr. Ziesenheim's letter of August 31, 1976. If necessary a new hearing date will be selected. In any event I expect that a firm discovery cut-off date will be fixed.

(4) *Other matters* — Particular attention will be given to the reports of plaintiffs' tests by McCrone and Rabinowitz which were to have been accomplished this summer, how the parties are coming along with the exchange of experts' reports in general, and whether procedures have been developed to minimize the possibility of controversy among experts in areas susceptible of empiric proof. (*E.g.*, duplication of test results.)

I will also wish to learn whether the parties have been successful in achieving a reasonably accurate estimate or means of estimating with reasonable probability the number of items produced by allegedly infringing processes, without the need for the enormous expenditure of time required to reach figures which are arguably more mathematically precise.

Finally, we can consider any additional matters as to which either party believes discussion would be useful.

* * *

So far as timing is concerned, I would request that each side submit a writing covering the requested discovery summaries and projections, along with any other items it views as topical for discussion, and file same with me at least three days before October 12. (A copy should, of course, at the same time be given to the opposing party.)

Very truly yours,

Bruce M. Stargatt

BMS:jv

LETTER DATED JANUARY 26, 1977 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex v. General Motors*

Gentlemen:

This pursues our conference of this morning attended for defendant by Messrs. Frost, Schuetz and Schwartz, and for plaintiffs by Messrs. Blenko, Ziesenheim, Alstadt, Shortt and Bender.

(1) *Trial date* — This matter is scheduled to be held beginning mid-February, 1978. That scheduling commitment remains firm.

(2) *Next conference* — We will again confer on Wednesday, April 27, 1977, at 9:30 a.m.

(3) *Testing*

(a) The Rabinowicz tests completed to date have resulted in thirty-three charges of infringement, winnowed down in some little degree (by eliminating perhaps two claims) as a result of advice from McCrone Labs to plaintiffs confirming defendant's position that those processes, involving a mere cleaning in a solution containing some sodium phosphate, do not result in the formation of a phosphate coating.

(b) The balance of the Rabinowicz tests will be completed by April 27. The only thing which it is anticipated may, but hopefully will not, retard this, is a delay in responses due from suppliers. (For example, Jones & Laughlin has in its hands a request to provide certain information as to specifications which need to be in hand before the Rabinowicz test relating to that process can be made.)

(c) It is not anticipated that there will be further tests by McCrone.

(d) The parties will continue to exchange test information on an amicable basis. Toward this point, defendant advises that Kenneth Ludema, who is employed by the University of Michigan, has set up and will be conducting lubricity tests on its behalf.

(4) *Infringement charges*

(a) Prior to the April 27 hearing plaintiffs expect to have completed their qualitative discovery and, with the anticipated conclusion of the Rabinowicz tests, to have given defendant their final infringement charges.

(b) With the infringement charges nearing completion, the record should be tidied up so there are no open qualitative discovery matters outstanding. Toward that purpose, prior to the April 27 hearing:

(i) Plaintiff will prepare a schedule identifying all open qualitative discovery.

(ii) The parties will confer so as to settle on what discovery needs to be withdrawn or revised, and what discovery each side wishes to press.

(iii) With respect to all interrogatories as to which a response is required, the parties shall answer or object to such interrogatories. In the case of objections, the parties should be prepared to state their respective positions. (While it is hoped that disagreements will be resolved it seems better to bring unreconcilable differences into the open at this stage rather than later.)

(iv) To the extent that plaintiffs' preparation does not permit them to answer or object to particular interrogatories, they shall be prepared to explain why they cannot do so and when they expect to be able to do so.

If this sequence is followed, by the time of our next meeting, three months hence, it is expected that there will be no outstanding discovery on the question of infringement which has not either been answered, resisted for arguably good reasons, or as to which there is not some specific plan proposed for response.

(5) *Quantitative matters* — Plaintiffs' Theory of Damages Memorandum dated January 19, 1977, advises that plaintiffs do not intend to try to prove defendant's actual savings and gains over the entire duration of the alleged infringement. Further, Mr. Blenko orally advised of his view that plaintiffs could be prepared to go forward in February of 1978, if matters proceed as anticipated, based on plaintiffs' theory of damages as set forth in that memorandum. Thus, both sides now appear to agree that the upcoming hearing will see a record made encompassing all the parties' evidence as to both infringement and damages. As I have said, this seems to me to be an eminently sensible approach.

In terms of quantitative proof, while stressing its contention that there has been little or no infringement; defendant repeated its view that pounds of phosphate and/or pounds of lubricant would be the appropriate measuring stick for determining the reasonable royalty controversy. And, although denying that it has relevance, defendant agreed that it seemed likely that the parties could work out a procedure to arrive at a reliable estimate of the number of parts which it is reasonably probable were produced by the various allegedly infringing processes.

It was concluded that the parties would by the time of the next hearing develop a procedure which could be utilized in arriving at the number of parts produced by the allegedly infringing processes. In the absence of such an agreed-to procedure an explanation will be made at the next hearing as to the problems encountered so that the Master may assist in the resolution of those problems.

Finally, plaintiffs indicated that they will or may have additional discovery on the issue of savings and gains. They will have a specific plan to present on this subject at the time of the next hearing.

Very truly yours,

Bruce M. Stargatt

BMS:jv

LETTER DATED APRIL 27, 1977 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al., v. General Motors*

Gentlemen:

This pursues our conference this morning attended for defendant by Messrs. Frost, Schuetz, Schwartz, and Pezzner (of Tom Lodge's office), and for plaintiffs by Messrs. Blenko, Ziesenheim, Alstadt, Shortt and Bender.

(1) *Trial date* — Trial of all issues before the master will be held February 20, 1978 through April 28, 1978. While it may be that the full ten weeks provided for will not be required, all counsel (and such representatives of the parties as plan to attend) are reserving that period on their calendars so that the evidence can proceed without the interruptions which might otherwise result from scheduling conflicts. I am doing likewise. As the trial nears, and the volume of expected evidence and testimony becomes more certain, a decision will be made as to whether it will be possible to proceed on the basis of a less than five-day trial week.

(2) *Next conference* — We will again confer on Tuesday, August 16 at 9:30 a.m.

(3) *Testing*

(a) The Rabinowicz tests are complete. Rabinowicz is scheduled to be deposed by defendant in June. Defendant indicated that it might wish to have made available prior to the deposition, for inspection, copying, and/or photographing, the raw data produced by Rabinowicz (tapes and notebooks), as well as the samples tested by him. It was thought that this might shorten, or possibly even dispense with the need for, the Rabinowicz deposition. The parties agreed to cooperate on this.

(b) McCrone will also be deposed by defendant in June.

(c) Ludema's testing is ongoing. The scope of the testing cannot be firmly fixed until plaintiffs' infringement charges are completed. It is hoped that Ludema, who at this stage can only supply a few days a month toward the testing project, will be able to devote a substantial chunk of time to the project during the summer and that his test results will be available before the end of the summer. (Discovery of the Ludema results, and the backup, was not discussed, it being assumed that cooperative arrangements will be made as to this information between the parties.)

(d) I believe it was indicated that plaintiffs currently plan no further tests and that defendant, except for Ludema and possibly an expert in the area of McCrone's analysis, also plans no further tests. In any event it is hoped that testing will be complete by August 16.

(4) *Cleanability* — While the Rabinowicz-Ludema tests center on the lubricity achieved as the result of defendant's use of various allegedly infringing processes, and the McCrone tests deal with the chemical content of certain of the coatings, discussion was had on the question of what, if any, expert testimony will be had on the subject of ease-of-cleaning. Plaintiffs will, on or before June 1, furnish defendant and the master with a letter (i) declaring their intention with respect to expert evidence on this subject, and (ii) explaining their view as to the materiality of cleanability so far as that subject relates to the master's responsibility in these proceedings. Defendant will respond with a letter not later than three weeks thereafter (by June 22) stating its own position on both points, *i.e.*, (i) declaring its own intention in respect of expert ease-of-

cleaning evidence, and (ii) explaining how cleanability is material to the issues as defendant sees them.

(5) *Infringement charges and answers to interrogatories* — Plaintiffs will furnish defendant with their final infringement charges (incomplete only to the extent that answers to outstanding interrogatories have not been received from outside suppliers) not later than May 18, 1977. They will at the same time answer all outstanding interrogatories from defendant, whether such interrogatories relate to the question of infringement or to other issues in the accounting. Plaintiffs will at the same time object to such interrogatories or parts thereof as they wish. (It was explained by plaintiffs this morning that the areas of objection are not likely to be extensive or troublesome.)

As far as the parties could tell, there are no unanswered interrogatories due from defendant to plaintiffs. Plaintiffs did, however, indicate that they intend to file further interrogatories directed to defendant. These will deal with defendant's quantitative approach to the accounting and, possibly, the development of facts on the question of cleanability. These interrogatories will be filed on or before June 1, 1977.

Although probably in an informal way rather than through interrogatories, plaintiffs indicated their intent to try to obtain further information as to savings and gains by use of the accused processes. While not conceding either the fact of savings and gains, or the significance of savings and gains, defendant agreed to cooperate in the furnishing of such records as plaintiffs seek to explore.

(6) *Qualitative matters* — Once plaintiffs' final infringement charges are made, an exercise which should be completed three weeks from today except for processes involving a few outside suppliers who have not responded to interrogatories, defendant believes that it can produce figures reasonably

representing the number of parts manufactured by use of the allegedly infringing processes. Defendant also believes that it can generate reasonably reliable information as to pounds of phosphate and pounds of lubricant used in the accused processes. This data, forming as it will the evidential basis for alternative arguments as to possible approaches by hypothetical negotiators in computing a reasonable royalty, should be largely assembled and available for review by the time of our next conference. Defendant will try to furnish the data to plaintiffs sufficiently in advance of the conferences so that either advance agreement on the numbers can be reached or, at the least, the likelihood of reaching agreement will be known.

(7) *Discovery cutoff; pre-trial order* — The next conference will bring us to a date almost exactly six months before the scheduled trial. We will then be ready to consider a discovery cutoff, and develop a procedure for the formulation of a pre-trial order. Even in advance of the proposed cutoff, both sides will use their best efforts to have noticed prior to the next conference such additional discovery as they think they will require. As to the proposed pre-trial order, it was suggested that this will be an extremely laborious undertaking which might take as long as a month of lawyer work on each side. The timing of that chore will be discussed when next we meet.

Sincerely,

Bruce M. Stargatt

BMS:jv

LETTER DATED AUGUST 19, 1977 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al., v. General Motors*

Gentlemen:

This is in follow-up to our conference of Tuesday morning attended for defendant by Messrs. Frost, Schwartz, Waldrop and Connolly, and for plaintiffs by Messrs. Blenko, Ziesenheim, Alstadt, Shortt and Bender.

(1) *Motion To Compel Answers By Plaintiffs* — A part of the conference was spent hearing out the basis for defendant's Rule 37 motion. During the hearing I indicated how I would rule. The enclosed Memorandum and Order is designed to summarize what I said, with one exception. My notes indicated that the date for the filing of the Answer to Interrogatory No. 49 was agreed as October 3, but I have no note or good recollection that we had specifically discussed a time for answering the other sub-interrogatories. Although unsure the point had been covered, I made the October 3 date applicable to all answers.

(2) *Defendant's Objections To Interrogatories 86 and 87* — Defendant has objected to plaintiffs' Interrogatories 86 and 87 because of the burden which will be placed on it if it is required to respond, and because it believes the answers if required would have no pertinency to the issues in the accounting. The objections, while neither briefed nor argued, were the subject of discussion at the conference. I indicated that a ruling on the objections would be deferred, believing that the parties would be able to reach a practical rapprochement with respect to information which defendant would furnish.

I do understand that defendant strongly urges that information as to units sold, and prices at which sales were effected, cannot be relevant to the accounting. While plaintiffs believe such information will be required by their experts, they have not refined their theory well enough to this point to be able to say with confidence precisely what data their experts will need. They will be doing so in order to provide the Rule 37-compelled answers, particularly the answer to Interrogatory 49. When they know just what it is they believe they need to prove, they will try to reach accord with defendant as to figures. This should be done, or at least be well under way, before our next conference. If agreement is impossible, I will review the areas of discord and consider the objections to Interrogatories 86 and 87. Both sides hope, as do I, that this will be unnecessary.

(3) *Melting Point Information* — During the course of discussing its motion to compel an answer to Interrogatory A-47-m, defendant indicated that it would be taking the position that a material called Parker TKPP as used by defendant does not infringe the Hendricks Reissue Patent. Defendant contends that Parker TKPP is not "meltable at a temperature below the melting point of the ferrous metal phosphate . . ." involved in the coating, and as such is not within Claim 4. Plaintiffs contend that in the form used by defendant the TKPP melts at a lower point than the melting point of the ferrous metal phosphate. It is important for each side to know whether the other intends to present any testimony on the subject, and if so, to obtain the essence of that testimony and its basis. The discussion prompted agreement between the parties to informally exchange melting point information and expected expert evidence on the subject so as to avoid surprise and in an effort to avoid controversy as to what scientists might view as empirically determinable facts.

(4) *Further Interrogatories* — Plaintiffs declared that they intend to quickly file interrogatories seeking information of the

sort searched-out by defendant's interrogatories A-47, A-48 and A-49. Defendant will try to promptly answer those interrogatories, but its answers will be deferred until plaintiffs' compelled responses are complete.

Defendant declared that it intended to put additional interrogatories relating to the Parker materials and, possibly, the broader melting point question. (The latter subject may be covered by an exchange of information in a different form, as previously indicated.) Plaintiffs will promptly respond.

(5) *Testing* — Plaintiffs expect the Rabinowicz lubricity tests (which it was thought were complete) to be wound up by the end of this month. The Henry Frieberg cleanability tests are apparently less time-consuming and should be done by the end of October. (The only variables are the tests which will or may need to be run on the Parker PTD 1286, which substance Mr. Waldrop will make sure plaintiffs promptly get, and a substance from American Chemical Products which plaintiffs have been promised).

Defendant cannot complete its testing until plaintiffs are done. But it will use its best efforts to do as much as it can and hopes, in any event, that its tests will be completed by some time in November.

The parties will continue to exchange test results.

(6) *Timetable* —

(a) The trial date remains firm for February 20, 1978.

(b) We will again confer on October 13, 1977, at 9:30 a.m. Prior to the conference either side may (but need not) submit a status report.

(c) At the conference there will be discussed, in addition to any other subject the parties wish to raise for consideration, the following:

(i) What, if anything, needs to be done to complete the preparation of the qualitative aspects of the case;

(ii) What, if anything, needs to be done to complete the preparation of the quantitative aspects of the case;

(iii) A date for the cut-off of further discovery;

(iv) The formulation of a pretrial order, including the procedures to be used in its development and a deadline date for its preparation.

Very truly yours,

Bruce M. Stargatt

BMS:kms
Enclosure

LETTER DATED OCTOBER 14, 1977 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al., v. General Motors*

Gentlemen:

This is in follow-up to our conference of yesterday morning attended for defendant by Messrs. Frost, Schwartz, Schuetz, Waldrop, Connolly and Pezzner, and for plaintiffs by Messrs. Blenko, Ziesenheim, Alstadt, Shortt, Bender and Anderson.

(1) *Qualitative Preparation*

The preparation of that phase of the accounting relating to plaintiffs' claims of infringement are in hand. This remains to be done:

(a) Plaintiffs will, within three weeks, have completed the Rabinowicz lubricity tests and the Frieberg cleanability tests. As soon as those tests are completed the test data will be transmitted to General Motors. Plaintiffs have undertaken, if the tests are done before the expiration of the three-week period, to get the results to General Motors forthwith. Plaintiffs also expect, within the same three-week period, to have received the final information from Parker*, Republic Steel and Lansing Heating.

(b) Defendant will, promptly upon receipt of the results of the Rabinowicz tests, arrange for the completion of the Ludema tests. It will also, after getting Frieberg's results, determine whether to conduct its own cleanability tests and, if so, arrange for those tests to commence. Defendant also may wish to depose Rabinowicz and/or Frieberg.

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* Mr. Waldrop represented that he would have answers to the outstanding interrogatories directed to Parker back to plaintiffs within ten days.

(2) *Quantitative Preparation*

There is considerable effort yet required to complete preparation of those aspects of the accounting relating to plaintiffs' claims of damage. To move toward completing this, the following needs to be done:

(a) Plaintiffs will, they expect within the next two weeks, have completed arrangements for the engagement of their expert or experts on the reasonable royalty issue. As soon as possible after the engagement of their reasonable royalty experts, plaintiffs will further supplement their answer to defendant's interrogatory A-49.

Plaintiffs will also, within four weeks, determine whether they wish to engage an expert to testify respecting the beneficial effects of the patent, which testimony they are considering as a possible predicate to certain of their reasonable royalty testimony. Upon the engagement of such expert they will promptly notify defendant.

(b) Upon receipt from plaintiffs of a more complete answer to defendant's damages interrogatory, defendant will reciprocate by providing a response to plaintiffs' similar interrogatory.

(c) (i) The parties will endeavor to complete discovery respecting the number of parts manufactured by the allegedly infringing processes.

(ii) The parties will further use their best efforts to develop reasonably reliable information respecting the prices at which the parts produced by the allegedly infringing processes were sold. On this point defendant has made it crystal clear that it does not believe that such prices would play any role in the discussions of hypothetical negotiators bargaining with respect to the value of the patented process in 1952. Plaintiffs have represented that their experts will be taking a contrary view, and will be relying upon price information in connection with the development of a royalty figure. I have indicated my feeling that plaintiffs will be given the opportunity to pursue this course, leaving to a later stage the question of whether plaintiffs' theory will be accepted, and (if it is) the weight, if any, to be given to the price information on which they will be relying. If plaintiffs cannot work out accommodation which they feel is sufficient to meet their needs, there will be created an important open issue which, unless promptly adjusted, could retard the accounting. It is hoped that the parties will be able to come together so as to resolve this.

(iii) Finally, plaintiffs' discovery on the question of savings and gains remains incomplete. Again, I have indicated my feeling that plaintiffs will be given the opportunity to offer evidence in this area, without prejudging either the relevance of such evidence, or the weight it merits if relevant. Plaintiffs will confer with defendant toward the purpose of amicably developing such facts as they believe are sufficient to their purpose.

(3) *Pre-Trial Order*

(a) Plaintiffs will, within two weeks, furnish to defendant a proposed draft of a pre-trial order covering all categories which they think ought to be included in the final version of the pre-trial order, and leave as few blanks as possible. Defendant will, within two weeks after the receipt of plaintiffs' draft, furnish their own counter-draft, again in a form as complete as reasonably possible.

(b) The pre-trial order, when complete, will include in addition to the subjects routinely to be covered (identification of issues, contentions, expected witnesses, documents, recital of facts agreed to and facts in dispute, etc.), either as an integral part of the order or separately, plaintiffs' anticipated approach to the evidence defendant expects to be introducing with respect to the effect of omitting borax, and with respect to ease of cleaning by noninfringing processes, which areas are flagged by defendant's interrogatories A-47-1, A-47-h, and A-47-i-5.

(4) *Time Table*

(a) The trial date continues to remain firm for February 20, 1978.

(b) We will again confer on November 15, 1977, at 9:30 a.m. Prior to the conference either side may (but need not) submit a status report.

(c) At the conference there will be discussed the areas covered by this letter, along with such other matters as the parties wish to raise. Particularly, the timing for the finalization of a pre-trial order, and a discovery cut-off date, will be settled.

Very truly yours,

/s/____________________________
Bruce M. Stargatt

BMS:jv

LETTER DATED NOVEMBER 16, 1977 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al., v. General Motors*

Gentlemen:

This is in follow-up to our conference of yesterday attended for defendant by Messrs. Frost, Schwartz, Schuetz, Waldrop, Connolly and Pezzner, and for plaintiffs by Messrs. Blenko, Ziesenheim, Alstadt, Shortt, Bender and Anderson.

(1) *Qualitative Preparation*

(a) Delays have been encountered in the completion of the Rabinowicz and Frieberg tests. They will be concluded not later than the end of this month. Thereafter defendant will cause the Ludema tests (in which Mr. France may be playing a role) to be completed. It will also decide whether to run its own tests on cleanability, possibly through Mr. France. All defendant's tests (including its possible cleanability tests) will be completed by the end of December, with test data to be transmitted to plaintiffs as soon as it is available.

After receipt of the reports on the Rabinowicz and Frieberg tests, (which reports, as previously noted, will be available by the end of this month), defendant will determine whether or not it wishes to take the depositions of Messrs. Rabinowicz and/or Frieberg. It will try to have such depositions, if it elects to take them, completed by January 9, 1978. Conversely, plaintiffs will decide after the receipt of the defendant's test data, (to be available by the end of December), whether it wishes to take the depositions of defendant's experts. Any such depositions will be completed by plaintiffs prior to the end of January, 1978.

(b) Defendant will be advising plaintiffs with respect to its position on the relevance of melting point information with respect to TKKP, TSP, and Molybdenum, as soon as it reasonably can, hopefully, in any event, prior to the end of December.

(c) The only third party discovery which remains outstanding are interrogatories to Parker, Republic and Lansing Heating, as well as depositions which have been or are about to be noticed of personnel at Parker and Braun Engineering. It has been represented to plaintiffs by counsel for Republic that the Republic answers will be received momentarily. When Republic answers the outstanding interrogatories, Parker will be in a position to promptly respond to the open questions addressed to it. Lansing Heating has been dilatory in the formulation of formal responses to the interrogatories addressed to it. Prior to November 22, plaintiffs will either elect to press its discovery addressed to Lansing (whether by deposition or otherwise), or abandon its attempts to get discovery from Lansing.

(2) *Quantitative Preparation*

While the development of information relating to plaintiffs' claims of infringement has struck some snags, it appears to be proceeding at a pace not likely to interfere with the trial of the case. On the other hand, the discovery of data relating to plaintiffs' claims of damage continues to be a possible bottleneck. Progress has been made, but much remains to be done.

(a) Although plaintiffs have identified a person whom they expect to be utilizing as a damages expert, they have another prospect whose engagement has not yet been finalized. They will decide whether they will be retaining him prior to November 28, and will advise defendant by that date if they determine to employ him. Further, by the same date they will advise defendant of the names of those persons whom they expect to call as witnesses respecting the beneficial aspects of the patent. This will be followed, in a sequence which cannot be now precisely timed, by plaintiffs' answers to defendant's damages interrogatories, defendant's reciprocal answers, and depositions of both sides' experts if thought necessary.

(b) In proving what they will be contending to be a reasonable royalty, plaintiffs will be relying on sales by defendant of parts produced by the allegedly infringing process. Toward this purpose they indicate that they have need to establish the number of parts so manufactured, as well as the prices at which those parts have been sold. The number of parts produced by accused processes appears to be pretty well in hand. The prices of those parts are not.

From plaintiffs' side, in the best of all possible worlds they would be discovering out from defendant precise information with respect to the price of each part sold during the entire period of alleged infringement by each of the accused processes. But for plaintiffs to obtain sliderule exact information along these lines would, in the circumstances of this case, be a mind-boggling task. Defendant, contending that such data is irrelevant in any event, understandably resists producing it in all its detail because of the enormous burden involved. My frequently expressed view is that plaintiffs will be allowed to present their case in their own way so as to make a record which will allow this controversy to come to a final rest. Plaintiffs' needs for information, however, must be balanced against defendant's legitimate desire to avoid being loaded with an unreasonable onus. In the hopeful expectation that it will be unnecessary for me to strike the balance, the parties have been encouraged to develop a procedure which will allow plaintiffs to obtain price information which they believe reasonably sufficient for their purposes consistent with defendant's understandable interest to avoid being overwhelmed with requests for data which could take thousands of man hours to try to assemble. I am encouraged that the parties, as well represented as they are, will themselves be able to reach a practical accommodation.

As a start, plaintiffs will by Friday of this week be sending to defendant separate letters relating to the prices of articles (in many cases representative articles) produced by accused processes at defendant's various divisions (and possibly plants). Defendant will disseminate these requests. To the extent reasonably possible defendant will comply with those requests. Where compliance is impractical, defendant will advise plaintiffs of the degree of burden and the reasons for it. The parties will then try to come together on a solution suitable to plaintiffs' needs and comporting with defendant's objections.

As information is received by defendant responsive to plaintiffs' price requests, it will be furnished to plaintiffs. In this way plaintiffs' damages experts will get an earlier handle on the pricing phases of the case.

(c) Plaintiffs' proof with respect to savings and gains now seems to be focusing in on two areas, *viz.*, appropriation requests and burden figures.

Some appropriation requests have already been received by plaintiffs. A request has been made for all other appropriation requests relating to the accused processes. Defendant will, within the next few days, advise plaintiffs as to whether an index of appropriation requests exists in a central place. If so, that index will be made available to plaintiffs in order that they may select those apparently relating to the accused processes. If not centrally available, defendant will confer with plaintiffs as to how plaintiffs may alternatively discover out the possibly relevant appropriation requests.

Where changeovers have occurred, but no appropriation requests are available, the information contained in the appropriation requests will have to be developed independently. The dimensions of this area of discovery, and consequently the work involved in completing it, are presently unknown. From plaintiffs' side the advantage of an appropriation request is that it shows what they will be claiming to be an estimated savings as a result of a changeover to the accused process, and an actual savings (as they will be arguing) for the year or so following the changeover as contrasted with a similar earlier period. Hence, the appropriation request contains in itself information which plaintiffs will contend shows savings achieved by defendant by shifting to the accused process.

But where changeovers have occurred without appropriation requests, savings of the type arguably shown through those requests will have to be built up in some other way. Plaintiffs will make a reasoned effort to pinpoint the information they need in this area. While it would be wasteful to complete that chore until it is known what appropriation requests are available, it is presently known that no appropriation requests exist for the Chevrolet bumper-making operation at Livonia. Plaintiffs will promptly formulate a request for the type of information they wish with respect to that plant.

In pursuit of savings and gains, as with pricing information, plaintiffs would presumably be pleased to offer precise proof of benefits allegedly achieved by defendant on a day-by-day basis for each of the accused processes through the entire period of alleged infringement. But the dimensions of that task would be almost boundless. Hence, mindful of the burden on defendant, plaintiffs have indicated that they will favorably consider restricting their requests for information as to savings and gains to the year or so immediately prior to the changeover to accused processes and the year or so immediately after, this being the period which I understand to be covered by the appropriation requests. From this they believe they will be able to generate more generalized savings and gains projections sufficient to what they perceive to be their needs. As to plaintiffs' aim to offer in support of their savings and gains theory evidence of savings in burden or overhead (to be distinguished from the direct savings which they believe will appear from the appropriation requests), this information is readily identifiable within the appropriation requests, where such are available. In the absence of appropriation requests, burden data will need to be separately developed. Plaintiffs will be submitting their inquiries on this contemporaneously with their other savings and gains requests. The parties will try to come together in an effort to come to a manageable solution.

(3) *Pre-Trial Order*

Defendant will furnish its revised version of plaintiffs' pre-trial order as soon as possible, providing portions thereof to the extent this can be done in advance of the complete draft. The parties agree that the preparation of the pre-trial order can profitably proceed contemporaneously with the completion of discovery. This has the advantage of smoking out problems at the earliest possible stage, and bringing the parties into necessary contact to try to resolve them. Nothing in such drafts will bind the parties. They will be treated as being in the nature of settlement discussions, and will be disregarded by me should they in some way come before me.

(4) *Time Table*

(a) No discovery cutoff date is fixed because of the uncertain course of the necessary quantitative discovery.

(b) The trial date continues to remain firmly embedded (subject to a slight quiver) in the date of February 20, 1978.

(c) We will again confer on January 5, 1978, at 9:30 a.m. By Noon on January 4, both sides are requested to submit a status report.

Very truly yours,

/s/ ______________________
Bruce M. Stargatt

BMS: jv

LETTER DATED JANUARY 13, 1978 FROM BRUCE M. STARGATT, SPECIAL MASTER TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al. v General Motors*

Gentlemen:

This is in follow-up to our conference of January 5 attended for defendant by Messrs. Frost, Schwartz, Schuetz, Waldrop, Connolly and Pezzner, and for plaintiffs by Messrs. Ziesenheim, Alstadt, Shortt, Bender and Anderson.

(1) *Qualitative Preparation*

(a) Plaintiffs' cleanability tests are still not completed owing to Dr. Frieberg's illness. It is anticipated that they will be done this week, with the resulting report to be furnished to defendants early next week. In anticipation of those test results, the Frieberg deposition has been tentatively set for February 1, with February 2 and 3 as back-up dates.

(b) The Rabinowicz tests are done. Certain information from Dr. Rabinowicz' notebooks has been requested by defendant. By now it is expected that it will have been provided. A tentative deposition date of January 23 for Dr. Rabinowicz has been fixed.

(c) Defendant's France-Kohn cleanability tests will be promptly completed, as will the Ludema lubricity tests. (I have the dates January 25 and 27 noted next to Ludema's name, but am not sure whether this relates to possible deposition dates or dates for his expected report.) Dr. Van Wazer is currently testing TKKP for defendant. His deposition is tentatively set for February 15, In addition, defendant will promptly decide whether it wishes to run melting point tests through Dr. France or some other expert. (Dr. Orthner will be plaintiffs' expert in the area of melting points.)

(d) Plaintiffs' melting point contentions were discussed. Defendant indicated that plaintiffs' position was less than clear to it. Particularly defendant inquired as to whether plaintiffs contend that "a solid inorganic compound [is] meltable at a temperature below the melting point of the ferrous metal phosphate" within the meaning of Claim 4 of the Henricks Reissue Patent if it becomes anhydrous below the melting point of the ferrous metal phosphate even if its "melting point" (in an artful sense) is higher than that of the phosphate. Plaintiffs contended that their position on the matter is already of record. I suggested that the contentions of the parties on the point be stated (or, if necessary, repeated), so that the differences in their views may be isolated.

(2) *Quantitative Preparation*

(a) The development of information relating to prices and numbers of parts continues, but appears to be in hand. It is expected that the furnishing of such information will be completed by the end of this month.

(b) The accumulation of appropriation requests and burden figures has struck some snags. About 25 categories of appropriation requests have been already furnished, and about 96 others have been requested. In order to identify appropriation requests which might bear on the use of the patented process, indices in New York City and in Detroit have been and will be the object of reference. There appear to be some changeovers not covered by any existing index. The parties are working toward a means of identifying these appropriation requests, although their proliferation may mean that one of plaintiffs' representatives will have to travel to various of defendant's divisions to examine original records there.

The appropriation requests (or most of them) contain information with respect to expected savings and gains. Defendant suggests this information is not a reliable indication of actual results. Plaintiffs, as I understand it, agree that actual figures would be preferable if they are available. The availability of such figures will be investigated over the next few weeks, and furnished to plaintiffs to the extent they are located.

Certain appropriation requests, which from their description in defendant's index appear to be possibly relevant to changeovers to the patented process, have proved upon defendant's examination to be in fact irrelevant. In such cases defendant has declined to produce them. Plaintiffs expressed concern with respect to defendant's unilateral determination of relevance. I indicated that where information might possibly or ostensibly be relevant (as in the case of appropriation requests whose facial relevance appears from defendant's index), those documents should be segregated by defendant. If plaintiffs are not satisfied with the reasons defendant gives for declining to furnish such documents, the documents will be furnished me, I will examine them, and I will rule on the relevance questions. If the documents are found by me not to be relevant, I will cause them to be sealed and made a part of the court record for further review if such is thought necessary. Of course in case of documents found by me to be of likely relevance, I will oblige defendant to turn them over to plaintiffs.

(3) *Contested Discovery*

On November 29 plaintiffs took the deposition of Richard P. Mueller. Mr. Mueller, an employee of Parker (now Oxy Metal) was subpoenaed *duces tecum* documents relating to Parker's answers to written ques-

> tions in these proceedings. During the course of the deposition it developed that there existed a list of accounts to which Parker sold Bonderite but which used a competitor's soap borax lubricant. Plaintiffs contended that the list was called for by the subpoena. Mr. Waldrop appeared at the deposition as counsel to Parker and the witness. In that capacity he took the position that the list need not be produced because (1) it was note used in the preparation of Parker's answers to interrogatories and was therefore not within the ambit of the subpoena, and (2) it was irrelevant to the issues in this accounting.

At last week's conference, while reserving his objections and without conceding the special master's jurisdiction to enter an order to compel, Mr. Waldrop furnished me with a copy of the disputed list and indicated he would be content with my deciding whether plaintiffs should have it. Although it had not seen the list, defendant joined with plaintiffs in requesting that the list be made available to the parties. My examination of the list was cursory. But I was satisfied that plaintiffs should have it. I did not do this on the basis of a reasoned decision that the document was either called for by the subpoena or was likely to lead to relevant proof. I had insufficient information to decide those questions one way or the other. Rather I was moved by the considerations that Parker had shown no reason *not* to make it available, and that both parties to this litigation felt it should be produced. In the process I indicated that were it decided that I had jurisdiction to decide plaintiffs' motion for sanctions (a decision which did not have to be made), I would, in the circumstances, not have awarded sanctions.

The controversy arising out of plaintiffs' Rule 37 motion stimulated a discussion about Mr. Waldrop's role in the case. While he is, and has been, of record for defendant, his underlying representation is for Parker. Without knowing, or needing to know, the details, I understand that Parker has a possible contractual and/or moral obligation to defendant to the extent its materials may be involved in infringement. Since it may have a dollar responsibility to General Motors in the event of an award, it has a derivative-type interest in resisting a result adverse to defendant.

It is not unusual to find more than one lawyer appearing for a single party, each representing somewhat different underlying interests. Such often occurs in casualty cases, where an insurance company's subrogation rights warrant the appearance of a lawyer selected by it appearing for the insured along with the insured's own lawyer. In all such cases, the lawyers of record for a single party must speak with a single voice. If there are differences between them, they must be resolved before positions are taken. That is the way it will be here. I view what occurred at last week's hearing as consistent with this policy, although it might have been otherwise had Mr. Waldrop declined to produce the disputed list in the face of Mr. Frost's request that it be made available.

(4) *Pre-Trial Order*

Both sides continue to believe that a great deal of trial time can be saved by the expenditure of a lesser number of hours in the preparation of the pre-trial order. The parties have jointly undertaken to dedicate themselves toward the preparation of a complete and useful document. Much has already been done in that direction, but much remains to be done.

One area where a great deal of testimonial time may be saved is in the area of agreed facts. For example, defendant has suggested the possibility of the parties agreeing as to diagrams or schematics of finished products which might show, among other things, the portions of the products manufactured as the result of the allegedly infringing process.

The parties also expect the pre-trial order to include an explanation of where the important contentions of the parties collide. A good example of this might be the parties' view with respect to melting point data, and how it fits the patent.

In all events the pre-trial order requires, and warrants considerable effort, toward the parties' pledge of a complete and useful trial tool.

(5) *Timetable*

(a) Both sides agree that the case could not be ready for trial on February 20, although the special master is well satisfied that the parties used their best efforts to ready themselves by that date. The new trial date will be *June 5, 1978*. That date is solid, and it will require a calamity of major proportions to move it.

(b) The parties continue to believe that ten weeks or so is realistic in terms of completing the evidence, and believe that that chore can be accomplished with a four-day trial week.

(c) The parties were requested to promptly advise their witnesses of the new trial date in order to avoid the possibility that the presentation of evidence will be interrupted as the result of vacation plans.

(d) In terms of the timing of the presentation of evidence during the trial itself, it was suggested that there might be some virtue in particular instances to getting all or most of the testimony on one issue into the record by both sides without the need for plaintiffs to finish their entire case before defendant starts. It is obvious that such could have beneficial economic effect, in the sense that if the experts on both sides dealing with the lubricity issue were to testify in sequence as to that issue only, they could be present in Court for a lesser period of time than would otherwise be the case. I indicated that I would leave it to the parties to make whatever agreements they could as to this. Absent agreement, the case will proceed in the usual way with plaintiffs presenting their full case before defendant begins.

(e) Except for reserved areas, and absent good cause shown, there will be no further discovery other than that which is commenced so that it may be completed under the rules by February 15. Excepted from the general February 15 cutoff date will be the following:

> (i) Since plaintiffs will not be answering defendant's damages interrogatory until February 15, defendant will not need to respond to plaintiffs' reciprocal interrogatory on the same subject until March 8.
>
> (ii) The parties will have until March 31 to depose their opponent's damages experts. It is expected that these examinations will be commenced earlier on. Early March dates were discussed for plaintiffs' experts at the conference.

(f) We will again confer on March 15 at 9:30 a.m. By Monday on March 14, both sides are requested to submit a status report.

Very truly yours,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:jv

LETTER DATED MARCH 21, 1978 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al. v. General Motors*

Gentlemen:

This is in follow-up to our conference of March 15 attended for defendant by Messrs. Frost, Schwartz, Schuetz, Connolly and Pezzner, and for plaintiffs by Messrs. Ziesenheim, Alstadt, Shortt, Bender and Anderson.

(1) *Disposition of Document Requests*
Contained in Plaintiffs' Letter
of March 2, 1978

These are covered by the enclosure. Plaintiffs expect to demand no documents other than those requested to date.

(2) *Infringement Charges*

Plaintiffs had completed their charges of infringement. However, by letter of March 13 defendant reported that plaintiffs had indicated that they proposed to add to their infringement charges as an accused practice the coating process at Oldsmobile prior to their overlapping the J & L coating (2481 Surfoglaze) which is charged. At the hearing considerable time was consumed discussing plaintiffs' reasons for adding the Oldsmobile coating charge. In the end it was decided by plaintiffs to withdraw this putative charge.

(3) *Experts and Tests*

While there are some loose ends respecting the lubricity tests, it is anticipated that they can be cleared up over the next few weeks without difficulty.

As to the cleanability tests, I requested that plaintiffs use their best efforts to make available to defendant the same machine as was used by Mr. Friedberg for the purpose of his test. Although this machine is not owned by plaintiffs, it seemed to me that the owner of the machine would likely favor plaintiffs in this respect upon an appropriate undertaking by defendant to be answerable for expenses (as the parties think appropriate) and for possible damage to the machine, an apprehension expressed by plaintiffs. Such reluctance as plaintiffs expressed on this point stemmed from defendant's insistence on using a lubricant other than that which was used by Mr. Friedberg. Their feeling was that since defendant was using another lubricant, it might as well use another machine. My own feeling was that it would be good to reduce the variables involved in the scientific testing, and the machine is one of them. Hence, my suggestion that plaintiffs make available the machine used by their expert. I did, however, indicate that if for some reason defendant felt it made no difference whether or not plaintiffs' machine was used, or if the parties could work out a form of words which would eliminate any uncertainty arising from this variable at the hearing, such would be satisfactory.

(4) *Plaintiffs' Motion for an Order Compelling Production of Documents Pursuant to FRCP 34 and 37*

On March 14 plaintiffs filed a motion for an order compelling defendant and its counsel Neal Waldrop, Esquire, to produce for inspection and copying the files of one P. F. Casella should it be in Mr. Waldrop's custody. Defendant took the position that the motion was not directed to it, but rather to Mr. Waldrop. Since Mr. Waldrop was not present at the hearing, and had no reasonable pre-notice of the motion, I asked Mr. Bender to contact him in order to fix a brief schedule and a hearing date for disposition of the application. By letter dated yesterday I was informed that a schedule has been agreed upon. Argument has been set for the morning of April 12.

(5) *Timetable*

(a) Defendant stated that it thought it would take two months or so to complete production of the items covered by plaintiffs' outstanding requests.

(b) After the production of documents is completed, plaintiffs will have three weeks in which to answer defendant's interrogatory No. 49.

(c) Defendant will have three weeks after receipt of plaintiffs' answer to interrogatory No. 49 to answer plaintiffs' reciprocal interrogatories on the same subject.

(d) After the answers to interrogatories are completed, the parties will have four weeks to take the depositions of their respective damages experts, and such other experts as have been identified.

(e) A new trial date of October 30 was set. Both sides believe it is realistic. The date selected will leave three months between the time discovery is expected to be concluded and the proposed trial. This will allow time for the parties to be preparing, and give some leeway for discovery housekeeping as well as the completion of the pre-trial order. Ten weeks continues to be the parties' best estimate for the duration of the trial. Since this will carry through the Christmas holiday, it was agreed that after the conclusion of testimony on December 21 the trial will not reconvene until January 8, 1979.

Very truly yours,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:jv
Enclosure

LETTER DATED APRIL 26, 1978 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al. v. General Motors*

Gentlemen:

This follows up the meeting we had on Friday, April 21, attended by Messrs. Frost, Waldrop, Ziesenheim and Anderson.

(1) *Plaintiffs' Motion for an Order Compelling Production*

On March 15, 1978, plaintiffs moved, pursuant to Rules 34 and 37, for an order compelling defendant and its counsel, Neal Waldrop, Esquire, to produce for inspection and copying the files of P. F. Casella in Mr. Waldrop's possession. The motion was fully briefed, and set down for hearing this Friday past.

At the hearing the initial question toward which the parties' attention was directed was whether the Delaware Court has jurisdiction to decide the motion. A strong argument is available (and has been made by plaintiffs) that there is jurisdiction here since the files are in Mr. Waldrop's possession and as such are subject to at least the constructive custody or control of defendant since Mr. Waldrop serves as defendant's counsel. The gist of the opposite argument is that Mr. Waldrop serves independently as Parker's counsel, that the Casella files are Parker documents, and that Mr. Waldrop's appearance of record for defendant in this case does not put the files in defendant's custody or control within the meaning of Rule 34.

In discussing the question of jurisdiction, it was apparent to all parties that the substantive issues relating to the producibility of the requested documents will be subject to adjudication either in Wilmington or in Detroit. The history and duration of this matter make it apparent that it would be imposing a very difficult job on a Federal Court in Detroit, unfamiliar as it would inevitably be with the complexities of this (almost unprecedentally) lengthy litigation, to oblige it to decide possibly subtle questions relating to production. Hence, apart from the requirement of the Rules, logic would suggest that the disputed issues be adjudicated in Delaware.

Mr. Waldrop's prime concern, based on instructions he had received from his client, centered on the claim of attorney-client privilege touching the documents in the Casella files. He indicated that Parker might be willing to permit the documents to be made available for examination by the Court in Delaware if in so doing Parker were not waiving such privilege as it might have. I stated that to determine the question of privilege the documents would have to be available for examination by an appropriate tribunal somewhere, and that I was entirely satisfied that by making them available for judicial review here Parker would clearly not be waiving whatever privilege it had respecting the documents.

Mr. Waldrop said he thought it quite possible that Parker might voluntarily allow the contested production questions to be decided in Delaware without the need for jurisdictional adjudication. It was decided, subject to confirmation from Parker to Mr. Waldrop, that:

> (a) Parker will produce those of the Casella files and materials as to which no privilege is claimed, relating to Parker's dealings with defendant and with the following companies which have bought products produced by Parker:
>
> Bethlehem Steel Company
> Braun Engineering Company
> Chemical Processing Industries
> Copperweld Steel Company

Crucible Steel Company
Jones and Laughlin Steel Company
Lansing Heat Treating Company
McLouth Steel Company
National Steel Corporation, Great Lakes Division
Production Finishing Company
Republic Steel Company
United States Steel Company
Youngstown Sheet and Tube Company

The foregoing are all companies to which Parker furnished materials and which in turn were suppliers to General Motors. Parker denies that there is anything in such Casella files relating to the litigation. I have no reason to doubt this. However, the regrettable document destruction by Parker in December, 1976, makes it necessary for plaintiffs to reach farther than would otherwise be required to make their case. Hence, the voluntary production of the Casella files, to the extent they are not subject to privilege, has been encouraged.

> (b) Mr. Waldrop will bring with him at the meeting we have scheduled for May 10 all materials from the Casella files claimed to be privileged. He will be prepared either orally at the hearing, or with the help of a pre-prepared list he may wish to furnish, to make representations with respect to the date of each document as to which privilege is claimed, the circularization of the document, and its substance. Where such representations leave me in no doubt that a particular document involved is privileged, I will be satisfied with the information presented and will not be looking at the document. Where I have doubt on the issue, I will examine the document and rule with respect to whether or not I believe the privilege applies. Either side will, of course, have a right to seek review of my ruling. Should the ruling be that there is no privilege,

> and should defendant desire to perfect an appeal from that ruling, I will allow seasonable time for this to be done and will not cause the document to be turned over to plaintiffs unless and until the ruling is approved by Judge Wright.

* * *

To emphasize, the arrangement outlined in the preceding lettered paragraphs is based on the assumption that Parker will give Mr. Waldrop the clearance he will be seeking. If no such clearance is obtained, I will rule on the motion to compel. Should it be determined that I have no jurisdiction, plaintiffs will have a right either to seek review of my ruling on that subject or go to Detroit to seek relief from the Court there. On the other hand, if it is decided that jurisdiction exists in Delaware, I will decide all aspects of the motion to produce on its merits. In so doing I will consider that I am writing on a clean slate, without being limited by the being-considered consensual arrangement outlined above.

(2) *My Representation of Hooker*

My letter of April 14 advised of my representation of Hooker Chemical, and the problem I thought it created. The parties agreed that the conflict is soluble by my withdrawing from the appraisal action currently pending in the Court of Chancery in which I appear as counsel to a Hooker subsidiary. I have advised Hooker that this is what I will be doing.

It was suggested that a written stipulation be prepared between the parties reflecting their understanding and acquiescence to this arrangement, and that Parker be a party to this agreement either by its signature to the stipulation or by a separate document. I agree that this would be an appropriate means of solving the problem. Hopefully it can be buttoned up at the hearing on May 10.

Sincerely,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:jv
cc: Neal A. Waldrop, Esquire

LETTER DATED MAY 11, 1978 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

Re: *Devex, et al. v. General Motors*

Gentlemen:

This is in follow-up to our conference of May 10 attended for defendant by Messrs. Frost, Schwartz, Schuetz, Connolly and Pezzner, and for plaintiffs by Messrs. Ziesenheim, Alstadt, Shortt, Bender and David Anderson, Jr. Also present for a portion of the conference, including that part relating to the subjects covered by paragraphs "(3)" and "(4)" below, was Neal Waldrop.

(1) Quantitative Discovery

(a) *Report*

It had been hoped that defendant could finish by the end of May the chore of investigating the existence of, and assembling where available, the documents set forth in the attachment to my letter of March 21, 1978. Much has been done along that line, but the job remains incomplete. The documents are being furnished as found, and defendant hopes that it will have concluded its efforts on schedule. In all events on June 9 it will file a written report covering each of the numbered requests, and indicating what has been produced and what it has not been able to uncover either because the documents have been destroyed or have simply not been found. In cases where defendant has come up dry in its search, for whatever reason, it will have the option of indicating to whatever extent it thinks appropriate the depth of its reasonable investigation, and the facts upon which it bases its conclusion that the sought-after documents have been destroyed or are unlocatable. Such explanation will be useful to the plaintiffs (and to me) in deciding what, if any, follow up may be required.

(b) *Retention Instructions*

At the same time it furnishes its report, defendant will produce any written instructions, given as the result of this lawsuit or the patent on which it is based, relating to the retention or destruction of records. Additionally, defendant will identify any oral instructions pertaining to the same subject matter. Claims of privilege or work product are reserved and, where made, will be ruled on prior to production.

(c) *Withdrawal of Deposition Notice*

Plaintiffs' Notice of Depositions dated May 1, 1978, is withdrawn. Part of the purpose of this notice was to discover out defendant's retention instructions, which purpose is accommodated by the arrangement set forth in the preceding paragraph. Plaintiffs' second purpose, to discover out the circumstances of document destruction, may be covered by defendant's report. To the extent it is not, plaintiffs will be free to renotice such depositions as they think they need, and defendant will be at liberty to seek protection if it believes such is required.

(2) Qualitative Discovery

Although not completed, this appears to remain in good control. The parties expect tests, reports and depositions to be wrapped up by the end of June.

(3) Waldrop Withdrawal

The parties shall have the opportunity to brief out the effect on plaintiffs' pending Rule 34 and Rule 37 motion of the notice of withdrawal served on Mr. Waldrop's behalf shortly before our conference. Letter memoranda on the subject will be filed by May 24.

(4) Parker Consent

Mr. Waldrop will inquire of his client, Parker, whether it will supply a writing, along the lines of the stipulation dated May 10 signed by plaintiff and defendant, laying to rest any possible future claim that Parker's interests will be adversely affected by my (now ended) representation of Hooker Chemical. The writing is requested not on the theory that Parker is a party to this case, but rather because, although not a party, its status as defendant's indemnitor collided with the appearance created by my role as Hooker's counsel in the unrelated Chancery litigation to which I called the parties' attention. (I could not properly adjudicate defendant's liability, thus indirectly causing a potentially adverse effect on Parker, while at the same time representing Hooker which is Parker's parent.) If such a writing is not promptly obtained, the question of whether I may continue to act as special master will need to be put before Judge Wright.

(5) Privileged Documents

Offered for discussion was the status of two documents in defendant's possession, identified as a file memorandum dated May 6, 1966 from Mr. Frost relating to Devex v. GM, and a memorandum from in-house counsel, Stanley Ross, dated February 16, 1956 relating to the Henricks reissue patent. The Ross memorandum was furnished to plaintiffs except that a portion dealing with Mr. Ross' legal conclusions was masked out. The Frost legal memorandum was not produced. Defendant indicated it did not intend to rely on the Frost memorandum, or the expurgated part of the Ross memorandum. Plaintiffs said this being the case non-production was agreeable unless defendant at a later time decided that it wished to rely on the documents, in which case plaintiffs wanted to see them in full text. It was left that defendant would not be entitled to rely on either document unless it gave plaintiffs reasonable forenotice of its change of intention, at which point the Frost memorandum and the full text of the Ross memorandum would be furnished.

(6) Pre-Trial Order

This important job is ongoing. In specific terms Mr. Alstadt undertook to furnish defendant with a proposed table of contents, suggesting an allocation as to which party should undertake to draft which portion, by May 24. The parties will also give attention to starting the major work of listing witnesses and exhibits.

(7) Next Meeting

June 13, 1978, beginning at 9:30 a.m.

Sincerely,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:jv
cc: Neal A. Waldrop, Esquire

LETTER DATED JUNE 15, 1978 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex, et al. v. General Motors*

Gentlemen:

This is in follow-up to our conference of June 13 attended for defendant by Messrs. Frost, Schwartz, Schuetz, Connolly and Pezzner, and for plaintiffs by Messrs. Ziesenheim, Alstadt, Shortt, Bender and David Anderson.

(1) Quantitative Discovery

(a) *Report*

Defendant's responses to the production requests contained in plaintiffs' letter of March 28, 1978, leavened by the rulings contained in my letter of March 21, 1978 respecting those requests, were discussed. It does appear that the production of documents is relatively complete, with little remaining to be done. These few specific areas were raised by plaintiffs and considered:

> (i) The absence of follow-up justification studies pertaining to AR's 202-1, 202-2, and 202-3 is referred to on pages 4 and 5 of defendant's report. Although it has been represented that under normal practice such studies would not have been made, defendant will specially inquire as to whether follow-up studies were made and are available pertaining to the enumerated AR's.
>
> (ii) Should plaintiffs wish cost saving information for the Appropriation Analysis Section referred to at page 23 of defendant's report, they will promptly request such information in a specific way. Included in plaintiffs' re-

quest will be whether the information sought is within the ten-year period during which such information is available, or whether it is for an earlier period. If the latter, although defendant believes records are unavailable, it will double check.

(iii) Request for burden figures touched on at pages 12 and 13 of defendant's report continue to be in the works, and defendant is using its best efforts to assemble the information responsive to this request.

(iv) The parties addressed their special attention to privilege questions relating to the Pontiac legal file referred to at page 19 of defendant's response, as well as legal papers in the possession of defendant's counsel relating to the Delco-Remy and Cadillac divisions. Defendant explained that the Pontiac legal file contains calculations requested by counsel based on documents which it believes have been furnished or made available to plaintiffs in this case. The Delco-Remy file contains figuring which may be based on documents no longer available and therefore not furnished or exhibited to plaintiffs. The existence of a Cadillac legal file was mentioned, but its contents were not sufficiently in mind to be the subject of a description.

I articulated the preliminary reaction that calculations made from original documents at the request of counsel in order to assist him in evaluating a claim or a potential claim are not producible. On the other hand, where calculations are based upon documents which may be relevant to the litigation, and where such documents were available at the time the calculation was made but are not available now, the information upon which the calculations are based is itself probably producible. This is not because the calculations are *per se* relevant, but rather because they may provide the only way to get at the lost data.

With this in mind, defendant agreed to go back over its legal files so as to verify the extent to which its calculations were based on documents previously furnished or made available to plaintiffs here. To the extent such calculations were based upon documents no longer available, and assuming that the documents or underlying information contained in the calculation have been requested by plaintiffs in their production requests or interrogatories, a means should be developed between the parties to extract that information.

One of defendant's expressed concerns was that the very furnishing of the underlying information might disclose the mental processes of counsel because of the form in which the information appears. Defendant stated that it would not voluntarily furnish the information without some assurance that plaintiffs would not seek to capitalize on such inferences as they could make, or argue for, as to the thoughts and ideas of defendant's attorney. It was agreed that the parties would try to work this out, with defendant furnishing plaintiffs a proposed stipulation accommodating defendant's apprehension on this.

If the parties cannot agree in any respect on the production or non-production of the documents as to which defendant claims privilege or work product protection, I will make *ad hoc* rulings respecting the documents. Should such be necessary, I would appreciate the parties letting me know a few days prior to the next hearing. I will arrange for the presence of a court stenographer, examine the documents (to the extent I think they need to be examined) out of plaintiffs' presence, order the furnishing of documents or information which I think plaintiffs are entitled to have, and cause the balance of the documents (or all of them if I think plaintiffs are entitled to none) to be sealed along with the transcript of the *ex parte* proceedings for later review in the event it is sought.

(b) *Three Other Points Outside the Corners of Defendant's Response to Plaintiffs' Production Requests*

(i) Plaintiffs made an informal written request dated April 28, 1978 relating to reports of certain committees. Defendant is in the process of seeing whether such reports are available.

(ii) Plaintiffs requested Oldsmobile labor routings for bumpers for the years 1962 and 1963. Defendant will furnish these as they are available.

(iii) Plaintiffs indicated that they may wish recent cost data from Delco-Remy. Plaintiffs will promptly decide whether they require this information and, if so, will advise defendant without delay.

(c) *Defendant's Answers to Plaintiffs' Damages Interrogatories*

Defendant hopes that it will be able to file its answers to plaintiffs' open interrogatories by June 26 but, if such cannot be conveniently done, will in all events have its answers in the mail by June 30.

(d) *Depositions*

A deposition schedule of the various reasonable royalty witnesses has been tentatively fixed. It is anticipated that some, and perhaps all, of the depositions will be completed by the end of July.

(2) Qualitative Discovery

Over the course of the next six weeks or so it is expected that the wrap-up of the various qualitative experts will be completed.

(3) Correction of Plaintiffs' Interrogatory Answers

By letter of June 12 plaintiffs requested that new pages 17 and 28 be substituted for the prior pages of its answer to defendant's interrogatory A-49 filed June 5, 1978. Defendant had no objection to this request. I will effect it by causing the corrected pages to be stapled on top of the old pages in the original document record, and will treat them as having superseded the old pages.

(4) Defendant's Statement as if in Response to Interrogatory

On June 7 defendant filed a statement as if in response to interrogatory on the subject of instructions given as to the retention of documents. Page 11 of that statement refers to a letter of Mr. Schwartz to Delco-Remy dated March 11, 1974, and periodic notices to Pontiac since April, 1974. Plaintiffs wish to see these documents and defendant agreed to supply them, masking out portions as to which privilege is claimed or which clearly have no relevance to the pending proceedings.

(5) Pre-Trial Order and Next Meeting

Prior to our next meeting the parties hope to be able to give substantial attention to the pre-trial order. They will especially concentrate on assembling lists of proposed witnesses, and exhibits. It is hoped that by the time of the next conference a rough draft of a pre-trial order, although possibly primitive in form and certainly less than complete, will be available.

The next conference will be on August 2 beginning at 9:30 a.m. Hoping that it will be productive toward the formulation of the draft pre-trial order, the parties indicated that they would try to spend as much time as possible on August 1 in that pursuit.

Very truly yours,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:jv

LETTER DATED AUGUST 3, 1978 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex, et al. v. General Motors*

Gentlemen:

This is in follow-up to our conference of August 2 attended for defendant by Messrs. Frost, Schwartz, Schuetz, Connolly and Pezzner, and for plaintiffs by Messrs. Ziesenheim, Alstadt, Shortt, Bender and David Anderson.

(1) *Discovery Checklist*

(a) The melting point tests conducted by Henry Friedberg have been completed. The report of his test results will be furnished by plaintiffs to defendant on or before August 11.

(b) Defendant plans to take the depositions of plaintiffs' reasonable royalty experts, George Church and Richard Whiting, next Monday and Tuesday, August 7 and 8.

(c) Plaintiffs plan to take the deposition of defendant's reasonable royalty expert, Ed Haight, on August 23 and possibly August 24.

(d) Dr. Orthmer, who will probably be testifying on plaintiffs' behalf, *inter alia*, about the application of the patented process to GM's practice, is a potential candidate for deposition by defendant. At this stage defendant thinks it may not elect to take that deposition.

(e) Agnes Forester, who participated in the conduct of certain tests on behalf of defendant, may possibly be deposed by defendant. However, since her anticipated testimony is largely formal (what equipment was used, how it was set up, the manner in which the tests were run), the parties will try to reach a stipulation making such deposition unnecessary.

(f) Robert Willard is an expert engaged by plaintiffs for the purpose of doing savings and gains analyses, particularly stemming from the information contained on defendant's appropriation requests. Some of the sheets containing these computations have already been prepared, and they will be furnished to defendant in New York over this weekend prior to the taking of the Church-Whiting depositions. Most of the balance of the computations will be furnished to defendant by the end of next week. To the extent that there are any remaining, they will be furnished not later than August 18. After reviewing the Willard computations, defendant will decide whether it wishes to take Willard's deposition and, if so, the parties will make appropriate arrangements.

(g) Plaintiffs may rely on a further expert, Robert Kaplan, to provide theoretical backup in the general area covered by the Willard computations, *i.e.*, savings and gains. Plaintiffs will advise defendant as soon as a decision on this is reached, and make Kaplan available for deposition should such be requested.

(h) Plaintiffs also indicated that they may be calling as a witness on their behalf, Walter Pinner, who worked for Houdaille through 1958 or 1959. If called, Pinner is expected to testify as to favorable results experienced by Houdaille in the application of soap and borax over phosphate. Plaintiffs will finalize their plans on this, and advise defendant in writing as to the period covered by Pinner's expected fact testimony. Defendant will have the right to depose Pinner, but will probably not do so if Pinner's fact testimony is restricted to his personal experience and observations in and prior to 1959.

(i) Plaintiffs may take the deposition of William Wishart of Verson Press respecting the effect of production changes made after the patent was held valid. If they determine to pursue this, plaintiffs will give defendant prompt notice.

(j) Russell D. Pelton remains as a possible additional reasonable royalty witness whom defendant may wish to call. If defendant decides to do so, it will seasonably advise plaintiffs and they will have the right to depose him.

(k) Possible witnesses to be called by defendant on the subject of alternatives to the patented process which were available in 1952 are Hugh Gehman of Amchem, John Klopp of Rielley (sp.?) Whiteman Company, and Steven Bruce of Bruce Products Company. Mr. Bruce may also testify respecting the availability and use of a plain soap lubricant beginning in the early 1960's. Defendant will let plaintiffs know when a decision is reached on this, and plaintiffs will have the right to depositions.

(l) Defendant may call Eugene Christen of its own patent department, or another person from that department, to testify with respect to defendant's patent policies, including its licensing practices. Plaintiffs may wish to depose such witness.

(m) Defendant may call William Bowman, a General Motors employee now in Rochester, New York, respecting events in 1952 at Delco-Remy arguably material to the patented process. Plaintiffs will be permitted to depose him.

(n) Plaintiffs may depose Bruce Smith a retired General Motors employee, to interrogate him as to a memorandum dated June 30, 1952, which he prepared. This memorandum was found by defendant in the legal files of its patent department, and produced for plaintiffs from those files. During the course of Smith's deposition, plaintiffs will have the right to inquire into the subject of other memoranda, manuals, standards, and the like.

(o) Plaintiffs may wish to take the deposition of George Sukes at Cadillac in their continuing effort to explore the existence of committee reports, and other materials relating to the efficiency of the process which is the subject of their claim.

(p) Defendant produced for plaintiffs four years or so ago a booklet entitled "Selection of Die Lubricants for Metal Working" published in 1955 by the Manufacturing Staff and Die Lubricants Subcommittee of General Motors' Shop Lubrication Committee. The memorandum was reissued in 1959 with no changes. Plaintiffs asked for the production of an updated version. Defendant advised that there have been no revisions.

(q) The parties will try to reach agreement with respect to interest rate figures, without necessarily agreeing that any such figures are in fact legally applicable.

(r) During plaintiffs' inspection of the Saginaw facility on July 12 it was requested that GM furnish the plans and finished products relating to three small parts. Defendant agreed to do so. At the meeting yesterday plaintiffs requested that defendant furnish bumpers, and the materials which were used to produce them, as made up from two production lines which they saw on July 12 during an inspection at Chevrolet-Livonia. Plaintiffs suggested that this material, although bulky, would be helpful as a trial aid in illustrating their contention as to the utility of the patented process in the production of bumpers. Defendant indicated that it would find out whether plaintiffs' request could be practically accommodated and, if so, would advise plaintiffs as to the approximate cost of complying with the request. Upon doing so, if plaintiffs agree to bear the cost, defendant will furnish the requested materials.

(2) Briefs

The parties will exchange pre-trial memoranda on Thursday, October 26. No form with respect to the memoranda was thought necessary. Each party will file whatever it thinks will be most useful and informative.

(3) Pre-Trial Order

The preparation of the pre-trial order will continue. The parties will try to have the process description section finished by September 1. Lists of exhibits upon which each side will plan to rely will be exchanged on September 13 and, at the same time, each party will deliver to its adversary copies of exhibits which it believes its adversary does not already possess. The parties will thereafter review their adversary's exhibit list, and concede wherever possible the authenticity of listed documents. They will also undertake in good faith to agree as to those of their adversary's documents which can be admitted into evidence without formal proof, reserving objections in the areas of relevance and materiality only. While no date for the completion of the project was fixed, the parties were optimistic that the foregoing schedule will allow for the finalization of the pre-trial order seasonably in advance of the trial itself.

Defendant asked that plaintiffs have available at the trial for examination as trial witnesses Messrs. Hendricks, TeGrotenhuis and Shortt. Plaintiffs agreed to this request. The matter should be covered in the pre-trial order.

(4) Trial Date

The trial remains firm for October 30. I was asked to alert the court reporter, advising him of the need for daily copy. As you will see from the enclosed copy of my letter, this has been done.

I was also to try to arrange for a courtroom, and will move up on this within the next few days.

(5) Next Meeting

Our next conference will be on September 14 at 9:30 a.m. The parties will get together the day before and will, if time permits, let me have a pre-conference report.

Very truly yours,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:jz
Enclosure

LETTER DATED SEPTEMBER 18, 1978 FROM BRUCE M. STARGATT, SPECIAL MASTER, TO COUNSEL FOR THE PARTIES

(Letterhead of Young, Conaway, Stargatt & Taylor)

* * *

Re: *Devex, et al. v. General Motors*

Gentlemen:

This is in follow-up to our conference of September 14 attended for defendant by Messrs. Frost, Schwartz, Schuetz, Connolly and Pezzner, and for plaintiffs by Messrs. Ziesenheim, Alstadt, Shortt, Bender, David Anderson and William C. McCoy, Jr. (This was the first occasion of Mr. McCoy's appearance before me. He has had prior contact with the case. Defendant said that there is an off chance that he may be called as a witness. But, nonetheless, it indicated it has no objection to his appearing as counsel.)

* * *

As the trial date approaches, and the matter proceeds toward the development of a more formal record, the need for written summaries is reduced. This one will be short:

1. The Friedberg rebuttal melting-point tests are completed and Mr. Ziesenheim expected that the report would have arrived in his office by the time of our meeting. By now it ought to have been furnished to defendant.

2. Plaintiffs contemplate no more tests. The most recent Rabinowicz and Friedberg tests may engender additional testing by defendant, and possible follow-up depositions of plaintiffs' experts. A decision will be made on this soon, and defendant will advise plaintiffs of that decision. The wind-up depositions are being arranged for hopeful completion by the end of this month, with scheduling problems to be ironed out by agreement.

3. Persons are being identified as possible witnesses in the course of the finalization of the pre-trial order. Some of the names which appear on the witness lists are unfamiliar. It was agreed that where no deposition has been taken of a person whose name is listed as a potential witness, the party intending to call that witness will provide its adversary with a brief general description of the subject matter of the witness' proposed testimony, as well as those documents as to which it is expected the witness will be providing evidence. If the general description is insufficiently illuminating, the parties are encouraged to get verbal amplification. This procedure is not, however, designed to be a deposition substitute. Rather it is aimed at providing general notice to each side of something more than the witness' name but something less than a complete outline of his testimony.

As to the time by which the new-witness materials will be furnished, I must apologetically advise that my notes are inadequate. I think that September 29 was agreed to on this, but my scratch-marks leave me in doubt. Hoping (and believing) that you were more careful in recording the agreement than was I, the two sides are asked to review their notes to reconstruct the target date.

4. Defendant will try by September 26 to decide whether it wishes to take the deposition of Robert Willard.

5. The parties will be meeting on October 4 to further refine the proposed pre-trial order. At that time both sides will hopefully have their witness lists in final (or close to final) order.

6. A disagreement arose as to whether defendant ought to be obliged to put into the pre-trial order its contentions with respect to the standards of comparison against which its supposed use of allegedly infringing processes are to be measured. I declined to require that this be done.

7. On the subject of interest, the parties will stipulate to the extent possible. In the absence of stipulations, evidence will be taken. (To the extent that there are no stipulations, it might be advisable to include in the pre-trial briefs, or cover by separate memorandum, the parties' contentions with respect to interest, including the circumstances under which it is allowable, and if allowable, the basis on which it is to be computed.)

8. The pre-trial order will, it is hoped, be ready in final form on October 18.

9. The parties anticipate that they may be preparing exhibits in chart form as an aid to their presentations. They will try to exchange charts by the time the pre-trial briefs are due, *i.e.*, October 26.

10. Our next conference will be on October 26 at 9:30 a.m. Since the parties will be in communication on a fairly continuous basis between now and then, we left open the question of whether a meeting between them ought to be held the day before. If problems arise before the scheduled pre-trial conference, we will try to resolve them either by telephone conference or by getting together at a time to be agreed upon.

Very truly yours,

/s/ BRUCE M. STARGATT

Bruce M. Stargatt

BMS:jv

IN THE U.S. DISTRICT COURT
FOR THE DISTRICT OF DEL.
[Dated December 5, 1978]

Excerpt from Accounting Pretrial Order Statement
on Saginaw Steering Gear Division

* * *

Manufacturing Volume

The quantities of component parts manufactured at Saginaw Steering Gear Division by accused cold forming processes between 1957 and March 1969 are as shown in the tabulation below. The quantities include 10% extra for parts intended for service.

QUANTITY
(In Thousands)

							Model Year						
Part Name	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Cyl. Mtg. Ball Stud*						439	989	958	20	40	40	50	29
Pot Coupling					1523	1788	1794	1623	48	111	22	1061	613
Outer Race Blank										90	78	107	62
U-Joint Bearing	7794	5154	5961	7888	10868	7800	14910	19489	24036	21667	19859	19418	11214
Lower B.J. Housing					1597	1540	2725	3343	3324	3156	2895	3391	1958
Upper B.J. Housing					1111	1335	1580	1202	1170	1158	1305	1283	741

Lower B.J. Stud*	489	258	377	323	1597	2131	2725	3343	2324	3156	2895	3391	1958
Upper B.J. Stud*	486	543	792	720	1346	2829	3835	3342	3286	3424	3498	4281	2472
RVG Worm Blank					440	1240	1457	2048	3608	3415	3565	3750	2166
Manual Worm Blank								3425	2418	2146	1946	1708	986
Valve Sleeve				494	494	688	973	883	17	39	32	33	19
Upper Control Arm Shaft								1203	2005	2172	1778	2406	1390
Air Pump Rotor												1222	705
Stg. Shafts - Solid											6245	4776	2758
Stg. Shafts - Tubular											5089	4466	2579
X-100 Lower C.A. Shaft					338	550	566						

---

*Quantities for years 1957 through March 1967 represent total production of upper and lower ball joint studs and cylinder mounting ball studs using phosphate coated steel wire. 24.7% of this total were manufactured using Drawcoat 1044 over the phosphate.

* * *

DEVEX CORPORATION et al., Plaintiffs,
v.
GENERAL MOTORS CORPORATION,
Defendant.
Civ. A. No. 3058.

United States District Court
D. Delaware.
Nov. 8, 1967.

OPINION

CALEB M. WRIGHT, Chief Judge.

On April 17, 1967 the plaintiff, Devex Corporation (Devex) filed a series of eight interrogatories requiring the defendant, General Motors Corporation (GM) to disclose information with respect to all of its commercial cold forming operations over a wide variety of categories without limitation as to any specific process or period of time. The defendant, GM, has objected to answering the interrogatories.

GM objects on two grounds: one, that the interrogatories are too broad and should be limited to lubricants used by GM in its commercial cold forming process which fall within the ambit of Claim 4 of the Devex patent in suit as GM understands the claim to have been limited by the decision of the Seventh Circuit Court of Appeals, i.e., to lubricants which utilize a soap-borax film over an integral phosphate coating, and two, that it should be compelled to answer only as to the period between 1952 and 1956, the time subsequent to the granting of the reissue patent to Devex and prior to the filing of the complaint in this action.[1]

---

[1] GM argues that in its infringement suit, Devex is only entitled to prove infringements which occurred prior to the institution of the instant suit and thus that the interrogatories must be limited to the pre-1956 period. (Defendant's Answering Memorandum in Support of Defendant's Objections to Plaintiffs' Interrogatories 1 to 8 inclusive, pp. 8-9.)

The difficulty with respect to the interrogatories is premised upon the divergent views of the respective litigants as to limitations placed upon Claim 4 of the patent in suit by the Seventh Circuit Court of Appeals.[2] Devex contends that the Seventh Circuit found Claim 4 valid in accordance with the terms which appeared in the reissue patent.[3] Thus, the plaintiff argues that any process "which forms on the surface of metal a phosphate coating which superimposes thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound * * *" not limited to a soap-borax fixed film over an integral phosphate coating would infringe Claim 4 of its patent.[4]

In its prior opinion this Court stated that the decision of the Seventh Circuit Court of Appeals on the issue of validity of the patent in suit, and consequently their construction of Claim 4, would constitute the law of the case as to validity. Therefore, an essential precondition to determining the proper scope to be accorded the plaintiff's pending interrogatories is dependent upon the Seventh Circuit's construction of Claim 4 of the plaintiff's reissue patent No. 24,017. In sustaining the validity of that patent the Court said:

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[2] For the history of this litigation and its present status, see the previous opinion of this Court. Devex Corporation v. General Motors Corporation, D.C., 263 F.Supp. 17 (1967). See also, Devex Corporation v. General Motors Corporation, 7 Cir., 321 F.2d 234 (1963) and Devex Corporation v. Houdaille Industries, Inc., 7 Cir., 382 F.2d 17 (July 12, 1967).

[3] Claim 4 reads:

"4. The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating, and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the MOHs' hardness scale, and thereafter deforming the metal."

[4] Plaintiffs' Memorandum Reply to Defendant's Objections to Plaintiffs' Interrogatories 1 to 8, pp. 6-7, and Transcript of argument heard on September 14, 1967, pp. 31, 35, 49.

> "Plaintiffs claim that in the specific embodiment of Claim 4, the 'phosphate coating' is the abrasive coating of the Singer process—a seeming retrogression in the art. The overlying film is a fixed one and the 'solid meltable organic' constituent thereof is soap, the use of which had previously been found undesirable because of the cleaning problem. The 'solid meltable inorganic compound' distributed therethrough, meltable at a temperature below the melting point of the abrasive phosphate coating and having a hardness not more than 5 on the Motts' scale, is borax.
>
> "Plaintiffs argue that new and unexpected results flow from the conjunction of elements defined in the drawing process of the Henricks' patent; that tool and die life is greatly increased and severe drawing operations can now be performed which were previously impossible. Plaintiffs say there is a coaction during the high temperatures and pressures whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating; that the formulation of insoluble organic materials is inhibited and there is no cleaning problem.
>
> "There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks'

> process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties." 321 F.2d at 236-237.

Further, in response to GM's argument that Devex's claim was too broad and lacking in specificity the Seventh Circuit noted:

> "The examples stated in the patent in suit and the specification teach the use of soap and borax over phosphate. They give formulas for the soap and borax and they identify the phosphate coating baths so that one skilled in the art could make them. The trial court was in error in holding that Claim 4 in the patent in suit was too broad and lacking in specificity." At p. 238.

And in the companion case of Devex Corporation v. Houdaille Industries, Inc., supra, involving the validity of the same patent in issue and the interpretation of Claim 4, Judge Major, speaking for a unanimous court, observed:

> "There is evidence that defendant commenced use of the alleged infringing process as early as April 25, 1949, more than one year prior to the filing of the continuation-in-part application upon which was issued Patent No. 2,588,234, dated March 4, 1952, from which the reissue patent in suit was issued June 7, 1955. Thus, defendant contends *that the coaction on which this Court found inventiveness (a soap-borax fixed film over an integral phosphate coating)* was not disclosed by Henricks in his earlier but abandoned application; * * *" (Emphasis supplied).

And further:

> "The specifications including Examples XIX and XX, and the claims, including Claim 4 in suit, of the Canadian patent were identical with the 1950 United States application. Thus Henricks represented to the Canadian Patent Office that his 1950 United States application disclosed for the first time the soap-borax-over-phosphate, the premise upon which this Court sustained validity."

On the basis of the opinion of the Seventh Circuit, and that Court's interpretation of its own opinion in Devex v. Houdaille Industries, Inc., supra, as indicated by the quoted portion of that opinion, the validity of the patent in suit was sustained only by limiting Claim 4 to a soap-borax fixed film over an integral phosphate coating. This Court concurs in the result arrived at by the Seventh Circuit Court of Appeals.

[1-3] It is fundamental that interrogatories be limited to that which is relevant to the subject matter of the pending action.[5] In patent litigation this means that the permissible scope of interrogatories is defined by the claims at issue. Stanley Works v. C. S. Mersick & Co., 1 F.R.D. 43 (D.Conn.1939).[6] Applying these well established doctrines to the instant case, it is readily apparent that the interrogatories propounded by Devex may only properly inquire into lubricants used by GM in its cold-forming processes which involve a soap-borax fixed film over an integral phosphate coating coaction. Devex is not necessarily limited, however, to

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[5] 4 Moore's Federal Practice ¶ 33.15.

[6] E. I. du Pont de Nemours & Company v. Phillips Petroleum Company, 24 F.R.D. 416 (D.Del.1959) and Mall Tool Co. v. Sterling Varnish Co., 11 F.R.D. 576 (W.D.Pa.1951) relied upon by plaintiff do not dictate a contrary result.

Bonderlubes 235 and 246,[7] but may inquire into any other lubricants used by GM in its cold-forming processes which employ the soap-borax over phosphate technique.

[4] GM's second objection is also well taken. The position of plaintiff here is similar to that taken by the plaintiff in Cinema Amusements, Inc. v. Loews, Inc., 7 F.R.D. 318 (D.C.Del.1947). The plaintiff here, as there, contends that since damages, if authorized, may be collected to the date of judgment, disclosure may be compelled for the period subsequent to the commencement of the suit. At this stage of the proceedings, however, the issue is not one of damages but whether or not there is a cause of action;[8] and, as Judge Rodney said in Cinema Amusements, Inc. v. Loews, Inc., supra:

> "The cause of action or right to recover must be determined as of the time of the institution of the suit. If this right to recover be eventually sustained then evidence of matters happening subsequent to the institution of the suit may, perhaps become material as to the question of extent of damages or other relief, but until that time comes and the right to recover or to relief be established, information to be required on interrogatories will be confined to a period prior to the institution of the suit." 7 F.R.D. at p. 321.

---

[7] GM has already given answers to plaintiffs' interrogatories with respect to two lubricants, Bonderlube 235 and Bonderlube 246 which it claims are the only two lubricants used by GM prior to 1956 which involve a soap-borax fixed film over an integral phosphate coating.

[8] It is axiomatic that plaintiff must prove than an act of infringement occurred prior to the filing of the complaint.

No different rule applies to suits for patent infringment. Deller's Edition, Walker on Patents, § 651, p. 1959.

[5] Absent a sufficient showing that inquiry relative to acts of infringement subsequent to the commencement of the suit may lead to the discovery of evidence relevant to acts of infringement prior to the commencement of the suit, this Court will follow the previous ruling of Judge Rodney in Cinema Amusements, Inc. v. Loews, Inc., supra.

Therefore, the plaintiff's interrogatories will be limited in time to the period from the date of reissue of the patent to the date of the commencement of this suit.

Submit order.

IN THE DISTRICT COURT
OF THE UNITED STATES
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

DEVEX CORPORATION, ET AL., *Plaintiffs,* vs. GENERAL MOTORS CORPORATION, ET AL., *Defendants.*	CIVIL ACTION NO. 56 C 1912
DEVEX CORPORATION, ET AL., *Plaintiffs,* vs. HOUDAILLE INDUSTRIES, INC., *Defendant.*	CIVIL ACTION NO. 57 C 892

REPLY BRIEF FOR PLAINTIFFS

[Filed April 20, 1961]

* * *

[18] Claim 4 Is Definite

The Seventh Circuit holds that claims are definite "if in the light of the specifications and the state of the art they tell one skilled in the art with reasonable clarity what the patentee claims as his invention''; *Flexwood Co. v. Matt G. Faussner & Co.**, 145 F.2d 528, 536 (7th Cir. 1944).

There is an excellent discussion of the statutory requirements of definiteness in the recent case of *Georgia-Pacific Corp. v. U. S. Plywood Corp.*, 258 F.2d 124, 134-138 (2nd Cir. 1960); *Flexwood v. Faussner, supra,* in which the rule for this circuit is set out, is cited with approval. See also *Lever Bros. Co. v. Procter & Gamble Mfg. Co.*, 139 F.2d 633 (4th Cir. 1943).

[19] There are two requirements which must be met. The claims must distinguish the invention from the prior art and those in the field must be able to determine what infringes and what does not infringe.

Except where amounts or proportions are critical and their discernment is an essential part of the discovery, there is no requirement that claims specify amounts or proportions and the absence of amounts or proportions does not render claims indefinite. In other words and as the text *'Patent Claims'* by Ellis (1949), Section 401, says:

> ''When the Process Consists in Causing a Novel Mixture of Two or More Substances to React Together, It Is Ordinarily Not Necessary to Specify in the Claims the Relative Proportions of Such Substances.''

The inclusion of amounts or proportions in claim 4 would not assist in distinguishing it from the prior art. Defendants have been unable to find any reference showing a soap or organic binder and borax or a solid inorganic compound over phosphate (Main Br. pp. 16-19). The absence or presence of the amounts or proportions of binder and inorganic compound thus has no bearing on the question of anticipation. Claim 4 is readily distinguished from the prior art.

---

*In this case, the Court of Appeals sustained the following claim (among others) against the defense of indefiniteness:

> ''1. The method of making pliable a sheet composed of a flexible backing faced with wood veneer, which consists in splitting the veneer to divide the face into many narrow filaments whose long edges follow the grain of the wood.''

If defendants wish to avoid infringement of claim 4, all they need do is refrain from adding borax or other inorganic solid compounds to the soap. Claim 4 is clear enough. If you [20] have "a solid meltable organic binding material containing distributed therethrough a solid inorganic compound * * *" you infringe. If there is no organic binding material or no inorganic compound, then you do not infringe.

On cross-examination, Henricks put it quite simply:

> "Well, certainly we don't mean trace, analytical spectrographic quantites. * * * You either have borax or you refrain from having borax." (Tr. 501)

Defendants are trying to avoid the clear implication of their acts. They deliberately add to soap for use as a fixed film over phosphate not only one, but two meltable inorganic compounds, namely, borax and sodium nitrite (Tr. 727, 756). They make this addition because they deem it valuable to the result and they are estopped from denying the utility of it; *Kansas City Southern Ry. Co. v. Silica Products Co.*, 48 F.2d 503, 505 (8th Cir. 1931), certiorari denied 284 U.S. 626. It matters not how much borax they choose to add; if they wish to avoid infringement, they can refrain from adding the borax.

Defendants' witness Gibson had no difficulty interpreting claim 4. There is no evidence that anyone skilled in the art could not distinguish the present invention from what had gone before or could not tell what infringed and what did not infringe.

Claim 4 meets the statutory requirements of definiteness.

* * *

Opposition

Supreme Court, U.S.
FILED
APR 7 1982
ALEXANDER L. STEVAS
CLERK

No. 81-1661

In the

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,

Petitioner,

v.

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, Jr., individually and as Executor of the Estate of WILLIAM C. McCOY, deceased, THEODORE A. TE GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TE GROTENHUIS, and KATHARINE M. BASSETT,

Respondents.

BRIEF IN OPPOSITION TO GENERAL MOTORS' PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

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Counter-Statement of the Questions Presented

1. Where the District Court, in the exercise of discretion, adopted the Master's recommendation to award pre-judgment interest to make the plaintiffs whole under all the circumstances of the case, did not the Court of Appeals correctly refuse to find clear abuse of discretion, in light of:

(i) the statutory mandate to award "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty . . . together with interest and costs as fixed by the court", and

(ii) the decision of the Supreme Court in *Aro Mfg. Co.* v. *Convertible Top,* 377 U.S. 476, 505-6 (1964), and the subsequent authorities addressing themselves to the language of the statute and to its legislative history, including the express legislative purpose to award "not less than a reasonable royalty, together with interest from the time infringement occurred"?

2. Did not the Court of Appeals correctly affirm the District Court's award of a reasonable royalty of three-quarters of one percent (0.75%) of infringing bumper sales value of $1.2 billion, under all the circumstances of the case, including *inter alia:*

(i) the Master's well-supported findings that the Henricks process, once adopted, was the dominant or exclusive process at three of defendant's major bumper making divisions;

(ii) the Master's well-supported findings that Chevrolet at three different times sought to use non-infringing processes and each time abandoned the attempt and Pontiac and Cadillac tested and rejected or ignored non-infringing alternatives in favor of the Henricks process;

(iii) the Master's well-supported finding that "there emerged a detectable pattern at the major infringing divisions (Chevrolet, Pontiac and Cadillac) of the use of borax in bumper production until validity was determined, and then to TKPP, for long periods without substantial change";

(iv) the Master's well-supported finding that Chevrolet's "lack of satisfaction" with Oldsmobile's noninfringing practice (Montgomery 2481) "caused Chevrolet to stop using it";

(v) plaintiffs' proof of a realistic standard of comparison and savings based thereon, by infringing, of at least $1.53 per bumper; the royalty rate award approximated 9¢ per bumper;

(vi) the expert opinion on pertinent reasonable royalty rates, including the concession of defendant's expert that 5% of sales value is a good point of departure for a reasonable royalty rate from which to move up or down depending on the facts;

(vii) the District Court's well-supported findings that "GM failed to adduce a shred of reliable evidence that Devex's offer [of 0.75%] was unfair" so that the Master's recommendation to reduce the royalty rate to 0.50% was mere "speculation"; and

(viii) the Master's well-supported finding confirmed by both courts below that GM's evidence of an alleged reasonable royalty based on the supposed saving in lubricant cost was "contrived"?

3. Were not the lower courts correct in accepting the validity of the claim in suit where the issue was resolved by the Seventh Circuit in 1964 and the Supreme Court twice denied certiorari on the issue? Are not the findings of fact of the District Court on the accounting and of the Court of Appeals for the Third Circuit in its interlocutory and final decisions, that defendant's accused practices infringed the claim as thus adjudged valid, correct?

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No. 81-1661

IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,
Petitioner,
v.
DEVEX CORPORATION, et al.,
Respondents.

BRIEF IN OPPOSITION TO GENERAL MOTORS' PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

Plaintiffs-respondents, Devex Corporation, et al., oppose General Motors Corporation's Petition for a Writ of Certiorari to review the judgment of the United States Court of Appeals for the Third Circuit.

If the Court should grant GM's petition to review the reasonable royalty award on bumpers, we request that it also grant plaintiffs' cross-petition for a writ of certiorari (No. 81- filed on April 7, 1982) to review that award. Plaintiffs have also filed a Petition for a Writ of Certiorari (No. 81-1718) covering the failure to award any royalty for non-bumper infringement, which petition plaintiffs urge the Court to grant independently of General Motors' petition and plaintiffs' cross-petition directed thereto.

NOTE: Emphasis supplied throughout brief unless otherwise noted.

Counter-Statement of the Case

Validity and Infringement—Supreme Court Has Twice Denied Certiorari on Validity Issue; And Also Denied Certiorari On Infringement; Concurrent Findings of Fact of Infringement Well-Supported.

This is the third time in this case that defendant has petitioned the Court to review its question pertaining to 35 USC § 112's requirement that a patent "particularly point out and distinctly claim" the invention. It was Question 2 in GM's Petition for a Writ of Certiorari in 1963 following the Seventh Circuit validity decision. It was again Question 2 in GM's Petition for a Writ of Certiorari in 1972 following the Third Circuit infringement decision. It appears as Question 3 in GM's present Petition for a Writ of Certiorari in 1982 following the Third Circuit accounting decision.

35 USC § 112 is a requirement affecting patent validity. That the Henricks patent in suit fully met the requirements of Section 112 was decided nearly twenty years ago in the Seventh Circuit validity decision (cert. den. 1963; A76a). The question does not merit review now any more than it did before.

Question 3 is still a contrived one, based upon nonexistent premises:

(i) Wholly contrary to Petitioner's basic assertion that the validity trial Court of Appeals "confirmed the lower court's finding that the [Henricks] claim, if literally construed, is invalid over the prior art" (cf. Pet. p. 4), the validity trial Court of Appeals specifically held:

> "The fact that Claim 4 distinguishes from thirty-one references in a mature art, none of which anticipate, quite clearly establishes that the claim is not too broad and indefinite.
>
> "Patent claims should be generic in character and do not necessarily have to be specific. It is entirely

> proper to refer in Claim 4 to 'a phosphate coating' without specifying which 'phosphate coating.'
>
> "The examples stated in the patent in suit and the specification teach the use of soap and borax over phosphate. They give formulas for the soap and borax and they identify the phosphate coating baths so that one skilled in the art could make them. The trial court was in error in holding that Claim 4 in the patent in suit was too broad and lacking in specificity.
>
> * * * * *
>
> "Defendants claim the Patent Office did not consider * * * British Patent No. 494,830 * * *. There is no showing in this case that the most pertinent prior art was not considered by the Patent Office. On the contrary, we think the most pertinent art was cited and was found insufficient to negative patentability." (A68a-A69a).

(ii) The validity trial Court of Appeals did not "rewrite" the claim (cf. Pet. pp. 4-5) but held it valid as written because its elements (individually old and in other combinations) had been put together in this new combination which achieved new, unexpected and highly useful results (A65a-A69a). Accordingly, the cases cited by GM sustain rather than condemn the Henricks claim.

(iii) GM misstates the Seventh Circuit decision in the *Houdaille* case. There was no "Noninfringement Ruling" as premised by GM (cf. Pet. pp. 6-7). The Seventh Circuit merely held that Houdaille was entitled to a trial.* The decision is most aptly summarized by the court at the end of its opinion:

> "We decide nothing more than that summary judgment was improvidently allowed. Anything we have

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* Plaintiffs were required to prove the unexpected results of satisfactory lubricity and ease of cleanability (A92a-A94a) and the Third Circuit held that the plaintiffs proved such lubricity and cleanability here (A143a-A147a).

> said is not to be construed as a resolution of any factual issue." (A100a).

(iv) The petition is grossly in error in its essential premise that plaintiffs must show that the chemical reactions in the accused practices were as Henricks contemplated (cf. Pet. pp. 9, 11, 24). This was resolved conclusively a decade ago in the Third Circuit infringement decision* (cert. den. 1972) wherein the Court of Appeals held:

> "However, in evaluating this line of proof it must be kept in mind that Henricks claimed a method of lubricating a metal workpiece that yielded in drawing an unexpectedly favorable conjunction of lubricity and cleanability. He did not claim any patentable discovery of a chemical reaction or compound. Indeed, it was not essential to the patentability of the Henricks combination that he describe or even understand any chemical reactions that made it work better than other lubricating methods.
>
> * * * * *
>
> "But if it is directly determinable that the two lubricants have essentially the same components, are applied in the same way and that the results of their use are essentially the same, the disputation of chemists about the chemical interactions that occurred in the processes cannot be decisive.
>
> "Moreover, it may well be that chemical reactions differed in degree, and perhaps in kind as well, in different applications of the Henricks process. Claim 4, even as restricted and held valid in the Seventh Circuit, covers and protects the combination of soap and borax in proportions to be varied according to

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* Contra GM (Pet. p. 2), the Third Circuit's 1972 infringement decision was a complete reversal (and not only a partial reversal) of the District Court's noninfringement judgment (A324a, fn. 9; A148a-A149a). Moreover, contra GM (Pet. p. 4), the Third Circuit found that the Henricks process used by GM "made possible a simple and easy cleaning of the drawn workpiece" (A145a).

> the nature and difficulty of the draw to be facilitated so that the process will yield its claimed advantages over a wide range of drawing pressures and temperatures. It is not claimed that in every Henricks mix under every temperature, chemical reaction and its products will be identical.
>
> * * * * *
>
> "In these circumstances, the demonstrated effectiveness of GM practice in producing the satisfactory drawing and ease of cleaning that Henricks had achieved must prevail over any contrary inference drawn from disputed expert testimony as to comparative chemistry in what may well not have been equivalent situations." (A145a-A147a).

(v) With respect to the holding that GM's TKPP practices infringe, GM erroneously states that literal patent claim infringement was not made out (cf. Pet. p. 21). To the contrary, the Third Circuit opinion states expressly:

> "Defendant argues that the coaction of TKPP (or TSP) with soap did not produce the same chemical by-products as borax in reacting with soap. That is irrelevant: TKPP and TSP produced the critical results of cleanability and lubricity when substituted for borax. In addition, TKPP and TSP fit the literal language of the patent. This case is thus distinguishable from Sealed Air Corp. v. U.S. International Trade Commission, 645 F.2d 976 (C.C.P.A. 1981), in which the accused process did not read on the literal language of the patent." (A327a, fn. 10).

(vi) Another serious error in Petitioner's argument is its premise that the lower courts ignored 35 USC § 112 (cf. Pet. p. 22). In fact, the Seventh Circuit gave Section 112 extensive consideration in its validity decision (e.g. Paragraph (i) above). And the Third Circuit specifically referred to and relied upon the Seventh Circuit holding that Henricks Claim 4 was not invalid for vagueness (A143a, fn. 5).

(vii) The Third Circuit did not "cast aside the 'law of the case'" (GM Pet. p. 23). GM's argument that the Seventh Circuit decision limited Claim 4 to borax was first rejected by the infringement trial court in 1968 and was thereafter consistently rejected by the Special Master, District Court and Court of Appeals (101a-A104a, A179a,-A186a, A296a-A297a, A327a-A328a). In fact, as the Third Circuit observed in the accounting decision:

> "It is arguable that General Motors has waived its right to make this argument"

because GM failed to appeal the infringement trial court's granting of plaintiffs' motion to amend their complaint (A328a, fn. 11). In 1968 GM informed plaintiffs it had used only borax and plaintiffs learned of the TKPP use only at the accounting; waivers must be intentional and, clearly, plaintiffs never intended to limit the applicability of claim 4 to borax.

(viii) The Court of Appeals affirmed the District Court's finding that the borax (inorganic) rinse practices infringed where the beneficial results were obtained (A328a-A329a, A289a-A291a):

> "Where soap and borax are applied to the metal seriatim, instead of in a combined form, the process infringes the Devex patent where cleanability and its effects are put to use in the actual process."

The Court of Appeals' Affirmance Of The District Court's Finding On All The Facts That The Reasonable Royalty Rate On GM's Bumper Manufacture Infringement Is Three-Quarters Of One Percent (0.75%) Of Bumper Sales Value Well-Supported

1. Henricks Bumper Infringement At GM's Four Major Divisions.

There were four major bumper manufacturing divisions at G.M.: Pontiac, Chevrolet, Cadillac and Oldsmobile. There was also a relatively small separate operation at Fisher Body-Elyria.

a. Pontiac—For 13 years at Pontiac the Henricks system was the exclusive process used for bumpers. The Master found that Pontiac: (i) produced 100% of its bumpers with the Henricks system from December, 1955 through the 1968 model year* (A229a); (ii) concluded, after testing various non-infringing alternatives, that the Henricks process "has proven the *most satisfactory* for its use (A228a); and (iii) determined it was *"superior* for its purposes to the existing non-infringing practices" (A229a).

b. Chevrolet—The Master found that Chevrolet used the Henricks process to manufacture over 49 million bumpers or 88.5% of its total bumper production in the 10-year period from mid-November 1958 to the patent's expiration in March 1969 (A219a-A220a). He also found that the Henricks process was the "dominant lubricating system'' (A220a) and that it had come to ''monopolize'' Chevrolet's bumper manufacturing in this period (A221a).

Chevrolet sought to use non-infringing processes three different times, but, each time the attempt was abandoned. The Master's findings speak eloquently of the futility of Chevrolet's efforts to substitute for the Henricks process (A218a-221a).

c. Cadillac—The Master found that Cadillac "used the Henricks process as its lubricating system for 100 per cent of its bumpers manufactured from the 1962 model year through the 1968 model year (A232a). Thus, the Henricks process was clearly the dominant process at Cadillac for 7 years.*

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* Except for production of a limited number of bumper parts during the 1956 model year. It switched to a non-accused practice for its 1969 model year, which covered only the last 7 *months* of the patent. In the earlier period, from 1952 through the 1955 model, the Master found Pontiac cold formed bumpers by using an unsatisfactory non-infringing wet plastic spray process (A 225a).

d. Oldsmobile—Plaintiffs charged infringement at Oldsmobile from January 1962 until September, 1963 (accused practice 43) and from September, 1963 to March, 1969 (accused practice 46).

The Master found no infringement as to practice 43, but the District Court rejected this finding. It held this practice involved the use of borax (pursuant to the parties' stipulation in the pre-trial order) and thereby infringed (A301a). The Court of Appeals affirmed (A328a-A329a). This infringing practice 43 was used for 50% of Oldsmobile's bumper production during the period from January, 1962 to September, 1963.

The undisputed evidence and GM's own admissions establish that accused practice 46, used in making all Oldsmobile bumpers in the subsequent 5½ years, involved TKPP or borax. Oldsmobile then infringed in this period** and in any event GM did not prove noninfringement. Moreover, practice 46 was not an alternative available to GM when it started to infringe in 1952.

2. Henricks Was The Dominant Lubricating System For GM Bumper Manufacture.

The Master recognized the dominant position of the Henricks process at each of the three divisions (Pontiac, Chevrolet and Cadillac). He found "especially persuasive" the decision of these divisions to ignore the "soap-only or the Oldsmobile process" even *after* the patent was validated (A257a). Instead of switching to these allegedly non-infringing practices, defendant's major bumper divisions unsuccessfully sought to avoid the patent by substituting TKPP for borax in their lubrications—held by all three tribunals below to be an infringing process. As the Master noted:

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* It switched to a non-accused practice for its 1969 model year, which covered only the last seven months of the patent.

** The contrary finding (A 329a) is plain error. E.g., in its answering brief to the Court of Appeals (p. 40, fn. 2), GM again admitted that the "lubricant added [to tank 6 in practice 46] was the TKPP lubricant." The Master thought plaintiffs were estopped from relying on defendant's concessions (A 202a), a manifestly untenable position.

> "The Henricks process developed an allegiance in bumper making . . . Once used to form bumpers, the divisions employing it were reluctant to switch. Thus, there emerged a detectable pattern at the major infringing divisions (Chevrolet, Pontiac and Cadillac) of the use of borax in bumper production until validity was determined, and then of TKPP, *for long periods without substantial change.*" (A235a).

Illustrative of the importance assumed by the Henricks process in GM bumper manufacture are the following findings:

As to Pontiac, the Master found (A228a):

> "The evidence clearly shows that the reason was the superior performance of Henricks-type lubricants as compared to non-infringing substitutes."

As to Cadillac, the Master found (A232a):

> "Since Cadillac used the Henricks process as its lubricating system for 100 percent of its bumpers manufactured from the 1962 model year through the 1968 model year . . ., the fair inference is that the Henricks process was more satisfactory for Cadillac's bumper manufacturing operation during that period than non-infringing alternatives."

As to Chevrolet, the Master found (A218a-A222a):

First, as to Chevrolet's use of non-infringing Bonderlube 215 (soap only):

(i) In 1957 and 1958 Chevrolet experienced two *major* problems: namely, "with respect to the quality and cost of the bumpers manufactured . . . The plant had plating problems which were so severe that there were days at Chevrolet-Livonia in 1957-58 when bumpers could not be plated 'because the quality was so bad' that the line had to be shut down and the employees sent home" (A218a);

(ii) In September 1958 "unusual '. . . production problems [were] being encountered on 1959 Model [bumper] Parts' " (A218a);

(iii) "A Chevrolet Lubrication Manual published in 1967 says that such problems may be caused by improper lubrication . . .it recommends the use of soap and borax lubricants for severe draws . . . This Chevrolet document was anticipated by a publication of defendant's Shop Lubrication Committee issued in December 1955 . . . and reissued in October 1959 . . . recommending a dry soap and borax film for use in severe working conditions . . ." (A218a);

(iv) "Departing from the usual practice of changing lubricants at the time of a model changeover . . . [Chevrolet] Livonia switched in mid-November 1958 after the commencement of production of bumpers for the 1959 model from Bonderlube 215 (soap only) to Kerns 3833 . . . with full knowledge that Kerns 3833 contained borax" (A219a); and

(v) Chevrolet's "switch from BL 215 (soap only) to Kerns 3833 (soap and borax) beginning in 1958" was because the Henricks process was "better suited to *its needs* than the non-infringing alternatives" (A221a).

As to the second effort to avoid infringement, the Master found that Chevrolet during the period mid-November 1958 until mid-January, 1965, "avoided infringement to a limited extent [to cold form about 7% of its bumpers] by using a non-accused practice Montgomery DA 2481 or DB 2481 . . . because Oldsmobile had successfully used that product'' (A219a). However, he also found:

(i) Chevrolet's production experience with Montgomery 2481 ''had been *unsatisfactory* because that non-infringing lubricant created 'Bonderlube impressions' . . . requiring Chevrolet to shut down its production line every hour or so for die cleaning'' (A219a-A220a);

(ii) Chevrolet's *"lack of satisfaction"* with Oldsmobile Montgomery 2481 "caused Chevrolet to stop using it" (A220a); and

(iii) Chevrolet used the Henricks process "as its *dominant lubricating system* ["to cold form about 93 per cent of its bumpers" (A219a)] from mid-November, 1958 to mid-January, 1965 because it was more satisfactory to Chevrolet in its bumper forming operations than the non-infringing Montgomery 2481 which Oldsmobile had used" (A220a).

Finally, as to the third effort to avoid the use of the Henricks process, the Master found that Chevrolet, in the period mid-January, 1965 until the expiration of the patent in March, 1969, avoided infringement on about 16% of its bumpers by using a non-accused practice Bruko 27 or 27B (A220a). But, he also found: (i) despite the fact that Chevrolet was not exposed to a charge of infringement in its use of Bruko 27 or 27B,the Henricks process ''quickly came to *monopolize* Chevrolet's bumper making operation" (A221a); and (ii) the "choice" of the Henricks process "beginning in 1965 to the ultimate exclusion of Bruko 27 (soap only) was made because Chevrolet thought" the Henricks process "was better suited to *its needs* than the non-infringing alternative[s]" (A221a).

The superiority of the Henricks process over other processes in bumper manufacture was recognized by GM's Lubrication Manuals (see A218a).

GM made bumpers by infringing processes, as held below, amounting to $1.2 billion of sales value.

GM introduced no evidence to establish that its alleged alternatives were available to it in 1952, when it started to infringe the Henricks process, or that then or later, they gave GM equally beneficial results. The dominant use of the Henricks process by GM in bumper manufacture, at least at 3 of 4 of its major divisions with important use at the 4th, is eloquent testimony of its great value to defendant, over the entire life of the patent.

In addition to the general superiority of the Henricks process over alternatives, it had important specific advantages over them. Freedom of bumper design, especially for bumpers of complex design, was made practicable by the Henricks process. The Henricks process introduced significant cost savings in drawing one piece bumpers in contrast to two or three piece bumpers. And as the Master found (A232a), "Henricks contributed to benefits in the form of better appearance . . . less spot polishing . . . more satisfactory plating . . . less rejects . . . and a generally less messy and cleaner production line . . ."

3. Expert Opinion As To Reasonable Rate On Bumpers.

In accordance with 35 USC § 284 the parties presented expert testimony "as an aid to the determination of damages or of what royalty would be reasonable under the circumstances". Defendant's patent law expert Edward Haight, Esq. testified that licensing practices for process patents in the automobile industry are comparable to other industries. He also stated that on an outstanding invention the rate on sales could be as high as 10%, but that 5% was a good point of departure from which to move up or down depending on the facts.

The Master agreed with plaintiffs' experts on reasonable royalty that the Henricks process was, without doubt, a superior lubricating system (A229a).* He acknowledged that those experts, Richard Whiting, Esq. and George Church, Esq. were "knowledgeable experienced lawyers with good credentials in the area of patent license agreements". (A254a). They supported their opinion by detailed testimony as to the facts of record and their explanatory reasons, by reference to the established method of a hypothetical negotiation in which the patent is accepted as valid by licensor and licensee and the reasonable royalty is to be a percentage of sales value (A254a).

In their opinion, 5% of sales was a reasonable royalty on bumpers.

4. The License Offer of 0.75% of Sales Was An Offer Depressed By GM And Open Industry Infringement.

The patent holder in 1964, when the Seventh Circuit declared its patent valid and the Supreme Court denied certiorari, offered to license the industry at a royalty of 0.75% of sales, referred to by the District Court as "not overly generous" (A293a). In fact, it was seriously depressed; see facts stated in footnote.** And, as the Dis-

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* GM in answer to No. 3 of interrogatories dated September 20, 1968 also acknowledged that it had no available alternative equivalent in results to the Henricks process; and in its Pre-Trial Brief on the accounting referred to the perceived benefits of the process at Pontiac as "exceptionally great".

** 1. In January 1965, two months after the November 1964 offer, plaintiffs were sued by Rockwell Standard Corporation to declare the Henricks patent invalid. Similarly, Ford Motor Co. in June of 1967 sued plaintiffs to declare the Henricks patent invalid.

2. GM itself, controlling over 50% of the domestic automobile market, continued to assert the invalidity of the Henricks patent in the District Court, the Court of Appeals and the Supreme Court (467 F.2d 257, at 262).

(footnote continued on following page)

trict Court found, the Master's reduction of the 0.75% figure by 1/3 was based on nothing more than "mere speculation", there being no evidence that patent holder "would have accepted a lower royalty figure and, if so, what that lower figure might be." (A294a, affirmed, 332a).

5. Henricks Process Saved GM At Least $1.53 Per Bumper Over Alternatives It Used.

The District Court found that several of GM's divisions "substituted non-infringing processes for infringing ones and *vice versa*" in the manufacture of bumpers (A292a). Two of these non-infringing processes referred to by the District Court were as follows:

(i) Chevrolet, GM's largest bumper division, produced 100% of its bumpers from March 1952 through its 1954 model year, by hot forging and then contour polished them after forming.

(footnote continued from preceding page)

3. The Seventh Circuit in July 1963 (321 F. 2d 234, at 237) recognized that the defense of the lawsuit was being conducted, not only by GM and Houdaille, but by four of the chemical suppliers to the industry. Plainly, the chemical suppliers and GM were determined to wage an extensive litigation. Hence the offer to the industry at 0.75% of sales was not "free of one sided litigation pressure" (*Pitcairn* v. *United States,* 547 F. 2d 1106, 1119 (Ct. Cl. 1976).

4. In 1964 the Henricks patent had not been held infringed by GM or by anybody else; yet the patent was in industry-wide use.

5. All the relevant facts were not then known to the plaintiffs as to the many substantial benefits enjoyed by GM. Plaintiffs had not yet had any discovery on the issue of infringement and did not know all the advantages enjoyed by GM.

6. The patent in November 1964 only had 4½ years to run and accordingly would not reflect all the values of a valid and respected patent with 17 years of life.

(ii) Cadillac, another major bumper division, produced almost 100% of its bumpers from March, 1952 through its 1961 model year, by a method of cold forming bumpers with a wet lubricant (but no prepolished—i.e., flat polished-stock) and then contour polished them after forming.

Using these alternative processes as a standard of comparison, the uncontradicted evidence is that GM saved at least $1.53 per bumper by using the Henricks process.*

That $1.53 per bumper was in fact the minimum amount of savings between plaintiffs' standard (contour polishing after forming) and the Henricks lubricating system is beyond rational dispute. Both parties agree that the savings were due to a "reduction of contour polishing".**

GM failed to adduce any cost evidence with respect to any of its soap only alternative methods. The Master found that GM's contention that the royalty be based on the (non-existent) savings in the cost of the lubricant was "contrived" (A243a).

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* The District Court's conclusion that these alternative processes were "outdated" (A293a) is contradicted by its relying on them for its conclusion (A292a) limiting the reasonable royalty for the Henricks process to 9¢ a bumper (*i.e.*, the 0.75% rate it decreed). GM cannot rationally have it both ways. Moreover, GM did not rely on any noninfringing practice at Pontiac and Cadillac as its standard of comparison and the other three noninfringing practices used at Chevrolet were found by the Master to be unsatisfactory or abandoned in favor of 100% use of the Henricks process.

** GM conceded in its brief to the District Court that:

> "Since Standard Steel Spring and Houdaille each converted from soap and borax over bare steel to soap and borax over phosphate, their experience showed that phosphate was necessary to the reduction of contour polishing".

Inasmuch as it was the Henricks patent that introduced phosphate between soap and borax (or other inorganic compound) and bare steel, it was the Henricks patent that "was necessary to the reduction of contour polishing." Therefore, there is agreement that the Henricks process (a combination of soap and borax over phosphate) brought about the reduction of contour polishing costs for a savings of $1.53 per bumper.

Discretionary Award of Pre-Judgment Interest To Make Plaintiffs Whole Under All The Circumstances Of This Case.

Judge Wright, in the exercise of his discretion, followed the Master's recommendation and awarded prejudgment interest on the royalty award, stating:

> The purpose of this accounting is to determine the actual royalty G.M. would have paid had it been able to reach some accord with Devex. The Court calculated this royalty based on payments, coinciding with G.M.'s use of Devex's patent. G.M.'s payments did not follow this schedule. Indeed, G.M. has yet to pay anything. Thus, it must now be charged a premium for the additional benefit it has enjoyed from retaining the use of the royalty money over the many years since its first infringement. *To do otherwise would systematically undercompensate patentees* and encourage their infringers to continue fighting lawsuits long after the disappearance of any justification for doing so for the sole purpose of gathering in generous interest money that rightfully belongs to someone else (A297-298a).

The Court of Appeals affirmed, holding:

> The Special Master, affirmed by the district court, awarded interest (delay damages) at the prevailing corporate bond rate on the royalty payments as of the date those payments became due, calculated yearly (number of infringing parts made each year). On appeal, defendant contends that such an award was improper. We disagree, and hold that *under the facts of this case the award of interest as the yearly royalty payments became due was not an abuse of discretion* (A335a).

Argument

GM's petition should be denied because the two lower courts' decisions concurrently and correctly determined the questions sought to be raised by GM in its petition with respect to the accounting, because the other questions it seeks to raise have already been denied certiorari review by the Supreme Court on GM's two petitions from earlier decisions in this case, and because the decisions, insofar as adverse to GM, involve no more than application of settled principles to particular complex facts.

Defendant Has Not Shown A "Clear Abuse Of Discretion", Under All The Facts Of This Case, In The Award Of Pre-Judgment Interest To Make Plaintiffs Whole.

Statutory Language, Construction Below, and Pertinent Supreme Court Decisions.

35 U.S.C. § 284, since its amendment in 1946, mandates an award

> "adequate to compensate for the infringement, but in no event less than a reasonable royalty . . . together with interest and costs as fixed by the court."

In *Tilghman* v. *Proctor,* 125 U.S. 136, 160 (1888), the leading pre-1946 case, the Court noted that the statute as it then read, "made no mention of interest", and adhered to a "general rule" that "profits" do not accrue interest. The 1946 amendment changed the law in respect of interest, leaving no room for doubt regarding the propriety of pre-judgment interest on a reasonable royalty award.

Where, as here, the award of damages takes the form of a reasonable royalty payable in periodic installments, plainly, unless the award includes interest from the date each royalty installment was due, the patent holder will receive *"less"* than the reasonable royalty, and hence not receive *"adequate"* compensation, in contravention of the statute as amended. That was the position of the Master, the District Court and the Court of Appeals. The Master stated that denial of pre-judgment interest here "would frustrate the compensatory purpose of § 284" (A265a). Judge Wright, likewise, held that a failure to award such interest in this and like cases "would systematically undercompensate patentees" (A298a). The Court of Appeals in affirming the award of pre-judgment interest as "delay damages" (A335a) applied the statute similarly:

> Moreover, in a case such as this one, 35 U.S.C. § 284 itself supports the award of interest from the date of infringement. Section 284 requires that the damages be "adequate to compensate for the infringement." The complaint in this case was filed in 1956, and the Special Master awarded damages to plaintiffs for infringement which took place in that year. To do otherwise than award interest from 1956 would give defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs, and would deprive plaintiffs of money they should have had. Moreover, a failure to award interest as of the date of infringement would encourage defendants to draw out litigation for as long a period as possible. The only sufferer from such a result would be the *prevailing* plaintiff—the innocent party (A336a-337a).

The Supreme Court adopted this interpretation of the 1946 Amendment, in *Aro Mfg.* v. *Convertible Top,* 377 U.S. 476 (1964). Referring to the 1946 amendment and quoting the House report adopted by the Senate, the Court stated (*Id.* 505-06):

> "The object of the bill is to make the basis of recovery in patent-infringement suits general damages, that is,

any damages the complainant can prove, *not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages.*"

An identical view has been taken by the Court in applying 28 U.S.C. § 1498, under which the U.S. Government pays compensation for patent use. In *Waite* v. *United States,* 282 U.S. 508, 509 (1931) the Court stated:

> The statute grants 'recovery of his reasonable and entire compensation for such use.' We are of opinion that interest should be allowed in order to make the compensation 'entire.' . . . we cannot doubt that it was intended to accomplish complete justice as between the plaintiff and the United States.

Interest from date of use is included in the award in such cases as "delay compensation", *See Pitcairn* v. *U.S.,* 547 F.2d 1106, 1120 (Ct. Cl. 1976), even though the statute does not mention interest. The statute at issue here calls for "adequate" compensation "together with . . . interest" and thus *a fortiori* supports that allowance of interest from the date of infringement in order to make the patent holder whole.*

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* As the Court of Appeals stated below:

74. In *Pitcairn* v. *United States,* 547 F.2d at 1120-24, the court awarded delay damages "computed on a calendar year basis with interest starting on January 1 of each year on the royalties accrued during the preceding calendar year." *Id.* at 1121. Such an award was necessary to " 'accomplish complete justice as between plaintiff and the United States.' " *Id.* at 1120, *quoting Waite* v. *U.S.,* 282 U.S. 508, 509 (1931).

75. We see no reason to rule that § 284 does not allow an award of interest, or "delay damages," from the date of infringement in the face of the *Pitcairn* rule that § 1498 allows such an award. Sections 1498 and 284 mandate doing justice to the party whose patent has been infringed (A338a-339a).

Indeed, the provision of pre-judgment interest is now a standard element where the award is designed to provide a plaintiff with full and equitable compensation. *See, e.g., Jacobs* v. *United States*, 290 U.S. 13 (1933): interest from time of the taking is necessary to constitute "just compensation" under the Fifth Amendment.*

The Legislative History Of The 1946 Amendment Evidences A Legislative Intent To Provide For The Award Of Pre-Judgment Interest To Make The Patent Holder Whole.

The legislative history of 35 U.S.C. § 284 confirms that the intention of the Congress was to provide for interest from dates of infringement in the usual case of a periodic royalty award.

The 1946 amendment as reported out by the House Committee contained a provision giving the successful patent holder "his costs and reasonable attorneys fees to be fixed by the court and interest from the time the infringement occurred."[*] The House Committee Report stated in pertinent part:

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* This principle has been most recently applied, in the context of the antitrust laws, in *Catalano, Inc.* v. *Target Sales, Inc.*, 446 U.S. 643, 648 (1980), where the Court held:

> It is virtually self-evident that extending interest-free credit for a period of time is equivalent to giving a discount [from the purchase price] equal to the value of the use of the purchase price for that period of time.

Plainly, without pre-judgment interest here, the infringer would be getting a "discount" from the reasonable royalty, which would mean that the plaintiffs would be getting less than the "reasonable royalty", less than the adequate compensation, mandated by the statute.

Even where adequacy of compensation is not at issue and the statute is silent about interest, whether interest should be awarded depends on considerations of fairness and equity. *Blau* v. *Lehman*, 368 U.S. 403, 414 (1962). In our case adequacy of compensation is the issue, the statute is not silent on interest, the statute has the purpose of adequate compensation not less than a reasonable royalty, and both courts below have found that an interest award is fair and equitable.

> "The object of the bill is to make the basis of recovery in patent-infringement suits general damages, that is, any damages the complainant can prove, *not less than a reasonable royalty, together with interest from the time infringement occurred,* rather than profits and damages." (U.S. Code, Congressional Service, 79th Cong. 2d Sess. 1946, p. 1387).

This bill passed the House as reported. Cong. Rec., 79th Cong., 2d Sess. p. 1857.

The Senate Committee expressly "adopted" the House Committee Report "as the report of the Senate Committee on Patents", including the paragraph from the House Report set out above. Although the Senate Committee adopted the House Committee recommendation on interest (S. Rep. No. 1503, 79th Cong. 2d Sess. 1946), it did not agree to making an attorneys fee award mandatory nor to the limiting of that award to the patent holder. Accordingly, the Senate changed the Bill to read that the prevailing patent holder was entitled to "damages . . . together with such costs, and interest, as may be fixed by the court. The court may in its discretion award reasonable attorney's fees to the prevailing party upon the entry of judgment in any patent case." The Senate Report made clear that the purpose of the change was to render the award of attorney's fees discretionary, and not to affect the interest provision.

HR 5311, as so modified by the Senate Committee, passed the Senate. Cong. Rec., 79th Cong., 2d Sess. p. 9188.

When the bill as modified came back to the House, Congressman Lanham, who managed the Bill, explained the Senate changes as follows:

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[*] It originated as HR 5311, and was reported out by HR Rep. No. 1587 (79th Cong. 2d Sess. 1946 Pt. 2).

> The Senate amendments do not interfere with the purport of the bill. There is a provision with reference to attorneys' fees and how they shall be paid. (Congressional Record, 79th Cong., 2d Sess., p. 9881).

With that explanation, the House again passed the bill, this time as amended by the Senate (*id.*). The phrase "together with interest and costs as fixed by the court" in § 284 is clearly intended to make compensatory, prejudgment interest on reasonable royalty awards the normal rule, just as costs are awarded as a matter of course.*

The Authorities Since *Aro* Further Confirm This Interpretation.

After *Aro,*** in *Marvel Specialty Co.* v. *Bell Hosiery Mills, Inc.*, 386 F.2d 287, 290 n.3 (4th Cir., 1967), the court referred to the *Aro* decision as follows:

> The legislative history of the 1946 Amendment, as recited in the *Aro* case, *supra,* shows that the sponsors of the bill contemplated the allowance of interest *from the time of infringement.* (Emphasis in original).

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* The effect of the Amendment is correctly stated in 35 U.S.C., see Appendix II, § 70, note:

> 1946 Amendment. Act Aug. 1, 1946 amended section to make the basis of recovery in patent infringement suits general damages, that is, any damages the complainant can prove, *not less than a reasonable royalty, together with interest from the time infringement occurred,* rather than profits and damages.

** Even before the Supreme Court's *Aro* opinion, Chief Judge Leahy had awarded interest on a periodic reasonable royalty from the date of infringement, not as a penalty, but simply to make the patentee whole, affirmed as "well within the court's discretion", *Hartford Nat'l Bank & Trust Co.* v. *E.F. Drew & Co.,* 188 F. Supp. 347, 349 (D. Del. 1960); *affirmed,* 290 F.2d 589 (3d Cir. 1961), *cert. den.,* 386 U.S. 825 (1961).

The Court of Appeals, below, likewise quoted from *Aro* and stated:

> Thus, in *Aro* the Supreme Court identified the purpose of the amendment, and stated that it was part of that purpose that damages in the amount of a reasonable royalty plus interest "from the time infringement occurred" be recoverable.[*]

In *Georgia-Pacific Corp.* v. *U.S. Plywood,* 446 F.2d 295, 302 (2d Cir. 1971), the Court of Appeals for the Second Circuit sustained a pre-judgment interest award on an unliquidated amount for patent infringement, as within the District Court's discretion, in the absence of a finding of exceptional circumstances. The Court rejected the argument that by the 1946 amendment "Congress intended no change whatsoever in the existing law respecting interest." That view, said the Court, "fails to give sufficient weight to the specific language which the final bill did add: 'interest . . . as fixed by the court.' We agree instead with the position taken in *Sciaky, supra,* 415 F.2d at 1077, that 'the statutory provision for . . . interest [is] made discretionary with the district judge' ". The Court also stated that "indeed, USP [the patent holder] has a persuasive argument that the equities require GP [the infringer] to pay interest from the dates on which royalties would have been paid."

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[*] Quoting *Aro* in accord:

Saf-Guard Products, Inc. v. *Service Parts, Inc.,* 491 F. Supp. 996, 1011 (D. Ariz. 1980) ("interest" from "the end of each calendar year during the period of infringement"); *Colt Industries* v. *Index-Werke,* 205 USPQ 990, 1006 (D., D.C., 1979) paragraph 59: "interest from the time the infringement occurred"); *W.L. Gore & Associates* v. *Carlisle Corp.,* 198 USPQ 353, 371 (D. Del. 1978) ("compensatory interest on reasonable royalty awards, where necessary to make whole an injured patentee"); and *Corometrics Medical Systems, Inc.* v. *Berkey Bio-Engineering Inc.,* 193 U.S.P.Q. 467, 478 (N.D. Calif. 1977) (Finding 47: "interest from the time infringement occurred").

The Courts in all circuits that have spoken since *Aro* have ruled that pre-judgment interest on a reasonable royalty award is appropriate to compensate the patent holder adequately.* Only one Court of Appeals, the 7th Circuit, *Wahl* v. *Carrier,* 511 F.2d 209, 215 (1975) has added the proviso that the District Court should find "special circumstances" in order to make such an award. But even that court has undermined the basis for its proviso in a recent decision relating interest to adequate compensation. *In Re Crash Disaster,* 644 F.2d 633 (7th Cir. 1981). There it interpreted a Death Act calling for "fair and just compensation", as requiring that the judgment include an element "Augmenting the amount of income flow lost between death and trial". That increment is the same as prejudgment interest but is not called such because the Death statute at issue there did not provide separately for interest. Nevertheless, the court concluded, labelling it "prejudgment interest" was not reversible error.

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* Second Circuit: *Georgia Pacific Corp.* v. *U.S. Plywood,* 446 F.2d 295, 302 (1971); Third Circuit, even before *Aro: Hartford National Bank & Trust Co.* v. *Drew,* 188 F. Supp. 347 (D. Del. 1960) aff'd 290 F.2d 589 (1961) cert. den. 368 U.S. 825; after *Aro: Gore* v. *Carlisle,* 198 U.S.P.Q. 353, 371 (D. Del. 1978); Fourth Circuit: *Marvel Specialty Co.* v. *Bell Hosiery Mills Inc.,* 386 F.2d 287, 290 footnote 3 (1967); District of Columbia: *Colt Industries* v. *Index-Werke,* 205 U.S.P.Q. 990, 1006 (D.C., D.C. 1979); Fifth Circuit: *Abbott* v. *Barretine,* 160 U.S.P.Q. 524, 527 (N.D. Miss. 1968); Sixth Circuit: *G.E.* v. *Sciaky,* 415 F.2d 1068, 1976-7 (1969); Seventh: *Wahl* v. *Carrier,* 511 F.2d 209, 215 (1975); Ninth Circuit: *Saf-Guard Products Inc.* v. *Service Parts, Inc.,* 491 F. Supp. 996, 1010 (D. Ariz. 1980); *Corometrics Medical Systems, Inc.* v. *Berkey Bio-Engineering Inc.,* 193 U.S.P.Q. 467, 478, finding 47 (N.D. Calif. 1977), cf. the earlier case, *Radiator Specialty Co.* v. *Micek,* 395 F.2d 763 (9th Cir. 1968) where the Court allowed, with an attorneys' fee, treble damages but no interest on the treble damages; Tenth Circuit: *Maloney* v. *Crawford,* 511 F.2d 10, 13 (1975); *Milgo Electronic* v. *United Bus Communications,* 623 F.2d 645 (1980).

In *Maloney* v. *Crawford,* although the Court of Appeals affirmed a denial of pre-judgment interest, the court did so only because "considerable latitude is to be afforded trial courts" (511 F.2d at 14); the Court of Appeals stated that it was "in basic sympathy with [the] position" that the trial court had "erred in not assessing interest from the date of infringement", noting that it was following the Second and Sixth Circuits that an award of interest from the date of infringement is discretionary with the trial court (13-14).

In the present case, the award was granted in the exercise of discretion, "under the facts of this case" to give adequate compensation in view of the long delay in plaintiffs' receiving any award at all, indeed the entire life of the patent issued 30 years ago and 13 years beyond its expiration. As the Court of Appeals below stated:

> "where, as here, the interest is as much as or more than the royalties, a failure to award interest from the date of the infringement would mean that the losing defendant actually gains from the infringement and the lengthy litigation" (A337a, n. 17).

GM Offers No Reason For Rejecting The Interest Award As Delay Damages Under All The Circumstances Of This Case.

"Special circumstances" is a concept germane to a penalty award, not to adequate compensation for appropriation of plaintiff's property. Accordingly, although the Court of Apeals affirmed the "ruling that an award of multiple damages and attorneys' fees would not be appropriate in this case" (A340a, note), on the ground, apparently, of sufficient good faith to avoid that penalty, that is no reason, as the Court of Appeals correctly held, to "give defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs" (A336a). To withhold interest where, as here, it is an essential ingredient of adequate compensation, would be to penalize, in the Court's language, "the prevailing plaintiffs—the innocent party" (A337a).

The Master stated (A265a):

> . . . I would rule both as a matter of law and of

> discretion that interest should run from the date of infringement without regard to whether defendant's behavior warranted multiple damages or attorneys' fees.

As the Master noted, the present situation, realistically, is not different from the situations where a license provides for royalties that become defaulted (A265a-A266a);* or where there is an established royalty (*id.*); or where the Government is the user (A266a-A267a); or where a contract is breached (A267a-A268a); or where a defendant receives a benefit, but tortiously withholds the price. from the plaintiff (A268a-A269a). In all of these cases, interest is properly imposed from date of the breach, use, or wrong as the case may be.

Moreover, from its first infringement in 1952 to the present—some thirty years—defendant has had the benefit of the reasonable royalties wrongfully withheld. As the courts below held, equity and fairness require that GM reimburse plaintiffs for that benefit retained at plaintiffs' expense (A336a-A337a).

Defendant here adamantly refused to take a license on any terms, although the patent holder gave it notice it was infringing, in 1955, and commenced suit in 1956. As the Court of Appeals stated in this connection:

> . . . failure in a case like this one to award interest as of the date of infringement rewards infringers where those infringers have refused to accept or negotiate a royalty, and discourages the amicable licensing of patents (A338a).

Judge Wright correctly stated that to deny prejudgment interest here is to "encourage their infringers to continue fighting lawsuits long after the disappearance of any justification for doing so for the sole purpose of gathering in generous interest money that rightfully belongs to someone else" (A298a).

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* The Master found as a fact that for the kind of license involved here the hypothetical negotiators would have agreed on interest for late royalty payments (A260a-A261a).

The record here shows dramatic inflation in the pertinent period: e.g. the Consumer Price Index (base: 100 in 1967) rose from 80.4 in December 1955 to 191.5 in April 1978 and the Court will take judicial notice of the subsequent accelerating inflation. In federal claims such dramatic inflation must be considered to make the plaintiff whole and prejudgment interest is an appropriate way to take inflation into account. *Sauers* v. *Alaska Barge,* 600 F2d 238 (9th Cir., 1979) (compound interest awarded at 8% for 8-year period, from date of complaint).

Defendant's distinction between unliquidated and liquidated claims is not applicable here. The 1946 Amendment draws no distinction between liquidated and unliquidated claims. Why, then, read into it a distinction that the Supreme Court recognized to be "not a sound one" as long ago as 1933? *Funkhouser* v. *J.B. Preston Co.,* 290 U.S. 163, 168 (1933). Congress has made no such distinction, and the courts below have wisely refused to sanction one here.*

No "Special and Important" Reason Has Been Proffered For Reviewing The Discretionary Award Of Pre-Judgment Interest.

GM has failed to present any "special and important" reason for granting certiorari to review the discretionary judgment interest award. *Rice* v. *Sioux City Memorial Parks Cemetery,* 349 U.S. 70 (1955). There is no "real and embarrassing conflict of opinion and authority between Courts of Appeals." *See, Rice supra, at* 79. Indeed, since this Court's decision in *Aro,* there has been virtual uniformity among the Courts of Appeals. Only one Court of Appeals has required "special circumstances" for such an award—a standard that could in all likelihood be met here in any event—and this solitary opinion is of doubtful precedential value even within the circuit involved in view of the later rationale by the same court in *Re Crash Disaster, supra.*

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* Accord: *Johns Hopkins University* v. *Hutton,* 297 F. Supp. 1165, 1233 (D. Md., 1968) awarding prejudgment interest:

> "this Court does not believe that Congress intended the hoary distinction between 'liquidated' and unliquidated' claims, criticized by eminent authorty well before 1920, (footnote) to be mechanically applied when such application 'would thwart the compensatory purposes of the remedial legislation set forth in Section 12 [Securities Act, 1933]' ".

In truth, all that is involved here is the exercise of the sound discretion of the Master and the District Court in determining that on all the facts of this case an award of pre-judgment interest is fair and equitable in order to make plaintiffs whole. This result is in accord with the statute as amended in 1946, with the legislative history of that amendment, with the opinion of this Court in *Aro,* and with the opinions of the lower Federal courts.

In *Graver Mfg. Co.* v. *Linde Co.,* 336 U.S. 271, 275 (1949), the Supreme Court held that it does not "undertake to review concurrent findings of fact by two courts below in the absence of a very obvious and exceptional showing of error." Plainly no such showing is made here. Exercise of discretion being involved and the Court of Appeals having found no "clear abuse of discretion", the Supreme Court should decline GM's pitch to substitute another judgment for that of the District Court. *Piper Aircraft Co.* v. *Reyno,* 70 L. Ed. 2d 419, 436 (1981).

Concurrent Determinations By The District Court And Court of Appeals Of Reasonable Royalty—Three Fourths Of One Percent Of Sales Value Of Bumpers Made By Infringing Processes—Are Well-Supported By The Record.

GM's request for certiorari to review a fact determination; namely, the reasonable royalty on infringing bumper manufactures, falls far short of the Supreme Court's Rule 19 that certiorari will be granted only where the petition presents "special and important reasons". The concurrent findings of the District Court and the Court of Appeals, that ¾ of 1% is a reasonable royalty rate are amply supported by the record. There being no showing of "very obvious and exceptional" error, the Supreme Court does not "undertake to review concurrent findings of fact". *Graver Mfg. Co., supra.*

Contrary to GM (Pet. pp. 18-20), there is no conflict between the legal standard in the Second Circuit (*Foster* v. *American Machine and Foundry Co.,* 492 F2d 1317 (1974)) and the decision below. GM readily concedes (Pet. p. 19) that in *Foster,* the Second Circuit found that the Special Master's finding of fact of a reasonable royalty on the facts in that case "was not clearly erroneous." The Court of Appeals below stated that "the result reached—here—that an actual license offer, may, if *the facts* permit, be *a factor* in assessing a reasonable royalty —logically follows from *Trio Process*" (A332a-A333a). The concurrent finding of the District Court and Court of Appeals of the reasonable royalty is fully supported by all the facts.

Determinations By The Lower Courts On Validity And Infringement Are Well-Supported By The Record.

In posing Question 3, what Petitioner is really seeking is another review of the evidence which led three tribunals to the same conclusion.* This is no basis for certiorari; *Graver, supra.* No principle, the settlement of which is important to the public, is involved; *Forsyth* v. *Hammond* (1897), 166 U.S. 506, 513-4; *United States* v. *Rimer* (1911), 220 U.S. 547, 548. There is no conflict between the Circuit Courts of Appeals in the application of 35 USC § 112; *Keller* v. *Adams-Campbell* (1924), 264 U.S. 314, 319-20. The alleged need for clarification is not present.

CONCLUSION

Accordingly, GM's petition for certiorari should be denied.

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Dated: April 6, 1982

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* The Court of Appeals held that the fact findings as to TKPP and TSP were "not clearly erroneous" (A327a).

Petitioner's Reply Brief

Supreme Court, U.S.
FILED

APR 20 1982

ALEXANDER L. STEVAS
CLERK

No. 81-1661

IN THE
Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,
Petitioner,
v.
DEVEX CORPORATION, *et al.*,
Respondents.

REPLY BRIEF FOR PETITIONER, GENERAL MOTORS

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IN THE

Supreme Court of the United States

October Term, 1981

No. 81-1661

General Motors Corporation,

Petitioner,

v.

Devex Corporation, *et al.*,

Respondents.

REPLY BRIEF FOR PETITIONER, GENERAL MOTORS

I

Only This Court Can Settle The Law On Prejudgment Interest Under 35 USC 284

Certiorari should be granted on prejudgment interest for each of two reasons. First, a clear conflict exists between the federal appeals courts on the applicable law, as well as on the significance of this Court's quotation in *Aro Mfg. Co.* v. *Convertible Top Replacement Co., Inc.*, 377 U.S. 476, 505-6, (1964). Second, the ruling below muzzles defenses to dubious patents and questionable infringement charges. The public is dependent upon such good faith defenses to provide the courts with the opportunity to consider patent validity and scope.

There was no "exercise of discretion," contrary to the Devex assertion. (Brief, p. 17). The court below, as did the district court, relied on a general theory that failure to award prejudgment interest would "deprive plaintiffs of the money they should have had" and would "encourage defendants to draw out litigation for as long a period as possible." 336-7a; 298a.[1] This rule of thumb applies to and penalizes every defendant, regardless of the merit of its defenses. It prohibits the exercise of discretion. *Steinmetz* v. *Allen*, 192 U.S. 543, 563 (1903).

No defendant can do more than act "in good faith and not recklessly," as the master found GM did here. 209a. GM had a strong case. Successive invalidity and noninfringement rulings by the two lower courts were wholly in favor of GM and against Respondents. In the end, relief was denied to Respondent, Devex, on 47 of the 61 accused processes.

This Court's quotation in *Aro* v. *Convertible Top Replacement Co.*, 377 U.S. 476, 505-6 (1964), requires prejudgment interest, as Respondents point out. Brief, p. 18. The court below relied on this quotation. 336a. But the bill was passed only after deletion of the language quoted by this Court and substitution of nonmandatory language.

Contrary to the Devex assertion (Brief, pp. 20-22), the legislative history rejects mandatory prejudgment interest. The bill, as passed, is consistent only with the traditional disallowance of prejudgment interest on unliquidated damages in the absence of special circumstances, and with this Court's ruling to that effect in *Duplate Corp.* v. *Triplex Safety Glass Co.*, 298 U.S. 448, 459 (1936). Only a ruling by this Court can settle the proper interpretation of its own quotation in *Aro* v. *Convertible Top*, supra, on this important statute. The court below expressly noted its direct conflict with the Seventh Circuit decisions which have consistently followed *Duplate* v. *Triplex*, supra, on prejudgment interest under 35 USC 284. The present decision also conflicts with decisions in the First, Sixth and Ninth Circuits.[2]

---

[1] References to the joint appendix are identified by the suffix "a."

[2] Petition, fn. 37, p. 15.

The allowance of prejudgment interest under 35 USC 284 after a good faith, non-reckless, defense is not just a matter of private rights and remedies. This Court has observed the "notorious difference between the standards applied by the Patent Office and the Courts" in determining patentability. *Graham* v. *John Deere Co.*, 383 U.S. 1, 18 (1966). Final determination of patent validity and patent infringement is lodged in the federal courts to assure that the Court standard, not the more lenient Patent Office standard, is ultimately applied. But the Congressional objective can only be achieved if threatened infringers are stimulated to litigate good faith defenses directed to patent validity and alleged infringement. *Blonder-Tongue Labs.* v. *University of Illinois Found.*. 402 U.S. 313, 338 (1971). This Court has accordingly rejected the application of licensee estoppel, because it might "muzzle" such challenges. *Lear, Inc.* v. *Adkins*, 395 U.S. 653, 670 (1969). The decision below should be similarly reversed because it, too, seriously muzzles good faith attacks on patent validity and scope.

Long ago, this Court observed that it is "as important to the public that competition should not be repressed by worthless patents, as that the patentee of a really valuable invention should be protected in his monopoly. . . ." *Pope Mfg.* v. *Gormully*, 144 U.S. 224, 234 (1892). Nevertheless, the court below in this case considered "amicable licensing of patents" as the only policy consideration. 338a. This ignores the paramount public interest of stimulating good faith challenges to patent validity and unjustified patent infringement charges so that the courts can pass on them.

The ruling below, if allowed to stand, will shield patentees from court review. "Patentees are heavily favored as a class of litigants by the patent statute." *Blonder-Tongue Labs.* v. *University of Illinois Found.* supra, at p. 335. Future accused infringers will not ignore the fact that Plaintiffs in this very case made 58 new infringement charges in the accounting, thereby extending the accounting to a 6-year proceeding. The Respondents finally ended up with a judgment that was virtually doubled by prejudgment interest running during that extended time even though recovery was ultimately denied on 47 of the charges. A barrier to court review of patent validity and infringement, similar to that struck down by this Court in *Lear* v. *Adkins*, supra, will be the inevitable result.

II

The Facts Found By The Master Preclude The 0.75% Bumper Royalty Rate

Respondents argue that the courts below "found" 0.75% to be the reasonable royalty. Brief, p. 29. But the courts were in no position to make such a finding. The case was tried before a master who repeatedly found that 0.75% was "too high." 251-3a; 256a; 257-8a. In fact the Court of Appeals stated that the district court "decided that none of the Special Master's findings of fact was clearly erroneous" and added that "we agree." 322a.

The single relevant paragraph of the district court opinion merely states that the 0.75% figure rejected by the master is "not overly generous" and "is large enough to compensate Devex fully." 293a. Generalized observations of this sort, especially by a court that heard no witnesses on the reasonable royalty, are not findings of fact. The Court of Appeals recognized this point and characterized the matter as one of "results reached," rather than findings of fact. 323a.

The master noted and followed the law applied by the Second Circuit in *Foster* v. *American Machine and Foundry Co.*, 492 F(2d) 1317, 1321-2 (1974). On the found facts, which have not been held clearly erroneous, that decision can only support the lower 0.50% royalty rate the master found would be agreed to by reasonable negotiators. In rejecting the 0.50% rate, the courts below likewise rejected the Second Circuit ruling in the

Foster case. Thus, there is a clear conflict between the holdings of the Second and Third Circuits in setting a reasonable royalty.

III

35 USC 112 Has Always Been A Major Issue In This Case. The Ruling Below Shows The Need For Action By This Court.

Respondent correctly notes that GM has continuously argued that 35 USC 112 has been overlooked in the varying constructions placed on the single claim in this case. Brief, p. 2. But this is why this Court's ruling is now needed. Over GM's protests — the claim has now been converted by the court below to the "nose of wax" that this Court long ago condemned. *White* v. *Dunbar*, 119 U.S. 47, 51 (1886). And see *Diamond* v. *Diehr*, 450 U.S. 175, 215 (fn. 39) (1981) (dissenting opinion).

Respondents suggest that issues of 35 USC 112 are now moot because certiorari was not granted on earlier interlocutory rulings during the lengthy course of this case. The suggestion collapses of its own weight. It is hornbook law that denial of certiorari — particularly on an interlocutory ruling — is not tantamount to affirmance of the decision below.

The validity trial court, applying a literal claim interpretation, held the claim invalid for failure to satisfy 35 USC 112, and because it was met by the prior art. 33a, 55a, 58-9a. The Court of Appeals for the Seventh Circuit distinguished the prior art by adopting a strict and narrow claim construction based on the demonstrated borax coaction and the description of the specific borax lubricant in patent Examples XIX and XX. 94-5a, 66-7a. That court did not hold that the claim in its originally issued literal language complied with 35 USC 112. Indeed, the Seventh Circuit in the *Houdaille* noninfringement holding expressly stated that it would have held the claim invalid, had it not applied its strict and narrow claim construction. 95a.

The Third Circuit ruling now before this Court expands the claim contrary to the Seventh Circuit narrow and restricted construction. For the first time, the claim is even stretched beyond borax to extend to TKPP and other *nonborax* lubricants which cannot have the borax coaction. The claim, as now stretched, not only has its original invalid scope met by the prior art, but it covers materials not referred to in the patent and violates 35 U.S.C. 112. The court below has expressly relied upon this Court's ruling in *Graver Tank* v. *Linde*, 339 U.S. 605, 607-9 (1950). The majority opinion in that case is silent on 35 USC 112 (then R.S. 4888), while the dissenting opinion emphasizes that statute. The failure of the court below to consider 35 USC 112, despite Petitioner GM's arguments, is clearly attributable to the state of the opinions in the *Graver Tank* case.

CONCLUSION

This *cause celebre* improperly tilts patent infringement doctrine and patent infringement remedies towards the patentee. Unless the ruling below is corrected, the huge judgment based on "nose of wax" claim interpretations and mandatory prejudgment interest can only impel settlement rather than litigation by future accused infringers faced with dubious patents and questionable infringement charges. Public policy is frustrated and the judicial role in patent enforcement is curtailed.

The petition should be granted.

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OCTOBER TERM, 1981

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BRIEF ON THE MERITS FOR PETITIONER, GENERAL MOTORS CORPORATION

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QUESTION PRESENTED

Does 35 USC 284 require the award of prejudgment interest on unliquidated reasonable royalty patent infringement damages where there has been no finding of bad faith or other exceptional circumstances against the infringer but rather a finding (approved by the court below) that the infringer "acted in good faith and not recklessly"?

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[1] The plaintiffs in this case are: Devex Corporation, an Ohio Corporation; Technograph, Inc., a North Carolina corporation; Theodore A. TeGrotenhuis, an Ohio resident; Frederick B. Ziesenheim, a Pennsylvania resident; Marjorie E. TeGrotenhuis, an Ohio resident; William C. McCoy, Jr., an Ohio resident; and Katharine M. Bassett, a Connecticut resident. The sole defendant is General Motors Corporation.

GM's Rule 28.1 listing is Exhibit I, p. a-1, below.

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OPINIONS BELOW

The accounting opinion of the Court of Appeals for the Third Circuit dated December 15, 1981, immediately preceding the writ in this case, is reported at 667 F.2d 347, (Joint App., 303).[1] The opinion of the District Court for the District of Delaware on the accounting is reported at 494 F.Supp. 1369, J.A. 280.

Other opinions below, in chronological order, are as follows:

1. Opinion holding patent invalid in *Devex Corp. v. General Motors and Houdaille Ind.*, by the District Court for the Northern District of Illinois, dated February 1, 1962. (unreported) J.A. 3.

2. Opinion reversing invalidity judgment in *Devex Corp. v. General Motors and Houdaille Ind.*, Court of Appeals for the Seventh Circuit, dated July 12, 1963, 321 F.2d 234 (cert. den. 375 U.S. 971). J.A. 61.

3. Opinion confirming and explaining validity decision in *Devex v. Houdaille Ind.*, dated July 12, 1967, 382 F.2d 17. J.A. 85.

4. Opinion holding claim 4 limited to borax, in *Devex v. General Motors*, District Court for the District of Delaware, dated November 8, 1967, 275 F.Supp. 310. J.A. 757.

5. Opinion granting leave to file amended complaint, District Court for the District of Delaware, dated May 23, 1968, 285 F.Supp. 109. J.A. 101.

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[1] References to the joint appendix are cited as "J.A. ____". The joint appendix to the petitions for certiorari is the first volume of the joint appendix. We here omit the suffix "a" to the pages of this volume (nos. 1-344).

6. Opinion holding noninfringement by General Motors, District Court, District of Delaware, dated September 8, 1970, 316 F.Supp. 1376, J.A. 105.

7. Opinion reversing judgment of noninfringement, Court of Appeals for the Third Circuit, dated September 26, 1972. 467 F.2d 257 (cert. den. 411 U.S. 973), J.A. 138.

8. Report of Special Master on accounting, dated February 7, 1980 (unreported), J.A. 153.

JURISDICTION

The judgment of the Court of Appeals is dated and was entered on December 15, 1981. J.A. 341. A timely petition for rehearing was denied January 13, 1982. J.A. 343. This petition for a Writ of Certiorari was filed within 90 days of the latter date and was granted on the question here presented on May 24, 1982. The jurisdiction of this Court is invoked under 28 USC 1254(1).

STATUTES INVOLVED

The question presented involves 35 USC 284, which provides in its pertinent portions that the court shall award "damages adequate to compensate for the infringement . . . together with interest and costs as fixed by the court." J.A. 1.

The prior statute, also here involved, is Section 4921, R.S. as amended by the 1946 Patent Act, 60 Stat. 778. It provides that the court shall award "general damages . . . together with such costs, and interest, as may be fixed by the court." Section 4921, R.S., as so amended, is reproduced at J.A. 2-3.

STATEMENT OF THE FACTS

This case concerns the propriety of imposing prejudgment interest on reasonable royalty damages for infringement of reissue patent 24,017. J.A. 354. The patent expired on March 4, 1969. The patent concerns the old process of coating steel with phosphate and a lubricant prior to cold forming to a useful shape, such as an automobile bumper. The claimed improvement added borax or another "inorganic compound" having a melting point and hardness within defined values to the lubricant. The prior art described a like process using a lubricant containing an inorganic compound described and claimed in the patent for the same purpose. Claim 4 (the only claim in suit) does not literally distinguish between this prior art process and the borax processes to which the issues here were originally directed. J.A. 32-3.

a. Validity Proceedings.

Plaintiffs (Devex) filed separate suits more than 25 years ago in the Chicago federal court charging General Motors (GM) and Houdaille Industries, respectively, with infringement. The actions were consolidated on Devex's motion for trial on validity. J.A. 3,435. The trial court held claim 4 invalid for overclaiming and for other reasons. J.A. 3-60. The overclaiming ruling was based on anticipation by the prior art patent, which described the process of claim 4 employing an inorganic compound (other than borax) listed in Table I of the patent. J.A. 32-3, 371.

Devex appealed. It urged the panel of the Court of Appeals for the Seventh Circuit to reverse for several reasons. First, the record showed that borax added to a soap lubricant applied over phosphate surprisingly coacted in a chemical reaction with the soap and phosphate to create new boron compounds and otherwise improve lubricity and suppress the formation of hard to clean compounds. J.A.468-9.[2] Second, there was testimony of a tremendous improvement in die life, giving a thousand to one increase. J.A. 469-70.[2] Third, the court was invited to narrow claim 4 to distinguish over the prior art, and Devex represented that if the defendants wished to avoid infringement "all they need to do is leave out the borax." J.A. 472.[2]

The Seventh Circuit adopted the Devex arguments and reversed the district court. 321 F.2d 234. J.A. 61. The opinion describes at length the above advantages of borax over the pertinent prior art processes which did not include the particular combination of borax, soap, and phosphate. J.A. 65-7.

Following the Seventh Circuit validity ruling, General Motors phased out all of its cold forming bumper processes employing a soap-borax lubricant. It accepted Devex's invitation to "leave out the borax" and avoid infringement. From 1965 to the expiration of the patent in suit, General Motors bumper processes used no borax or any other boron-containing lubricants. This precluded the formation of any borax coaction products and abandoned the benefits, if any, which were attained by these products.

b. The Houdaille Infringement Proceedings.

Following the validity decision, the two cases were returned to the district court for separate trials on infringement. Devex moved for summary judgment in the *Houdaille* case, based only on Houdaille's undisputed use of soap and borax over phosphate in bumper production. The motion was granted. J.A. 76. Houdaille appealed. The panel included Judges Major and Swygert, who had sat on Devex's earlier validity appeal. The summary judgment was reversed in a unanimous opinion written by Judge Major. *Devex Corp. v. Houdaille Ind.*, 382 F.2d 17 (1967), J.A. 85. The opinion confirmed the restrictive language previously read into the patent claim to validate that claim over the prior art. It stated that:

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[2] Def. Ex. A-22. Admitted at accounting trial transcript at 3222.

1. The earlier validity opinion required a "narrow and restricted" construction of the patent claim in order to uphold its validity. J.A. 85 at 93.

2. The narrow and restricted application was to the "specific embodiment" relied upon by Devex in its original appeal, based on borax Examples XIX and XX of the patent. J.A. 85 at 93-5.

3. As so restricted, the patent claim could not even cover all cold forming processes employing a soap-borax lubricant over phosphate, so a summary judgment based on mere usage of soap-borax lubricants over phosphate was improper. J.A. 85 at 93-4.

4. The court further stated that "we can surmise with some assurance that if a literal reading of the claim had been relied upon, we would have affirmed the District Court in its holding of invalidity in view of the prior art."[3] J.A. 85 at 95.

c. The GM Infringement Proceedings.

On July 21, 1965, this case was transferred on Plaintiffs' motion to the District of Delaware.[4] The stated purpose of the motion was to avoid a possible defect in venue. J.A. 473. The GM answer had challenged venue because GM was not an Illinois Corporation and was not conducting any possible infringing process in the Northern District of Illinois, as required for venue in that court by 28 USC 1400(b). J.A. 427. No such operation ever was conducted in the Northern District of Illinois.

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[3] After this reversal, the *Houdaille* case was returned to the district court for trial of the infringement issue. But Devex settled with Houdaille for a total sum of $200,000, in return for a release for all past infringement and a free license for all future infringement. DX A-1, Item 20, admitted at accounting transcript at 2732. And see J.A. 246-7.

[4] The statement to the contrary in the opinion below, J.A. 305, is in error.

The infringement trial took place in 1969, after the patent expired. J.A. 350. Devex charged three processes, each using a soap-borax lubricant. J.A. 112-8. GM's proofs showed that in these accused commercial processes there was no unique result attributable to any coaction products of soap, borax, and phosphate, and that no coaction occurred. Devex introduced contrary evidence.

The trial court resolved the disputed facts in favor of General Motors. J.A. 105 at 132-3. It found that Devex failed to prove that the soap, borax, and phosphate coacted, or that new compounds were formed, or that the formation of water insoluble material was inhibited, or that tool and die life was greatly increased, or that there was "no cleaning problem". J.A. 132. Thus finding that the coaction essential to the validity holding was not present in the accused commercial processes, the court dismissed the case. J.A. 136-7.

The Court of Appeals for the Third Circuit reversed. 467 F.2d 257. J.A. 138. Its opinion referred to the close similarity between the accused 15% borax bumper process and the soap-borax lubricants of the patent. J.A. 143-4. The pretrial order stipulated that no cleaning problem was experienced with this accused process. The stipulation was expressly relied upon by the court in its reversal of the noninfringement judgment below. The opinion of the court made no reference to the other two processes.

d. The Accounting Proceeding.

On March 15, 1974, this case was referred to a special master for an accounting. After more than four years of discovery, the accounting trial commenced in October 1978 and terminated in February 1979. J.A. 160.

In the accounting trial, Devex contended that claim 4 covered any cold forming process using a lubricant containing borax, or "equivalent" in any amount, for any purpose, irrespective of actual results, and without regard to whether the work was or was not cleaned after forming. It also contended that GM could not have effectively used outside-the-patent cold forming processes such as soap-only over phosphate, and would have had to resort to more costly other alternatives. Taking this position, Devex accused a total of 58 additional cold forming practices and sought a money award of about half a billion dollars. J.A. 206. Some of the processes used soap-borax lubricants, but many used (or were alleged to use) lubricants with other inorganic compounds, and some used lubricants with no inorganic compound at all. Devex justified its charges on the latter processes because the steel was washed with rinse water containing neutralizing inorganic material before the application of lubricant.

The master held that none of the rinse processes infringed. J.A. 190-6. In 17 accused practices, the master found that there was little or no cleaning of the cold formed product. He concluded that these processes did not infringe. J.A. 186-90.

The master also held that the accused nonbumper processes were of slight importance to GM because a variety of prior art and other noninfringing practices were employed by or were freely available to GM. J.A. 234-5. Also, because of these available alternatives, he held that the lengthy and disputed Devex proofs of "savings and gains" individual to each accused nonbumper practice were based on a fatally defective standard of comparison. J.A. 234.

Devex also contended that GM had no practical cold forming alternative on bumpers. J.A. 214. The master found to the contrary. J.A. 222-5, 214, 216, 230-1. He accordingly rejected the reasonable royalty testimony of the Devex experts, which rested on this incorrect premise. J.A. 255.

Overall, the master recommended no award on 47 of the 61 accused processes, and rejected the Devex testimony on the damages for the 14 bumper process for which he did recommend an award.

The master's determination of the bumper reasonable royalty rested on his initial finding that soap-TKPP lubricants worked as well as soap-borax lubricants. From this he concluded that TKPP was a borax "equivalent" and that the TKPP processes infringed.[5] J.A. 179-85. This was notwithstanding the fact that the TKPP processes could not produce the same coaction products as the borax processes, and the absence of proof of any TKPP coaction at all. J.A. 185. He determined that claim 4 extended to any actually-used process involving an inorganic compound literally within the claim, provided only that the formed product is cleaned by a regular commercial cleaner — whether or not the inorganic compound actually affected lubricity or commercial cleanability. J.A. 169-73.

The master arrived at his reasonable royalty from the history of Plaintiffs' license proposals made in 1964. J.A. 250-53. These proposals were universally rejected, even though sent to each and every company Plaintiffs thought were using the patent and at a time when Devex was "on top." J.A. 252. The master accordingly found that the proposed license royalty rate of 0.75% of the OEM bumper price (0.36 percent of dealer price) was "too high." J.A. 256. Since there was no established royalty upon which to base damages, the master postulated license negotiations in which he traced the bargaining positions he thought negotiators would take. He found the reasonable royalty to be 0.50% of OEM bumper price (the same as 0.24 percent of dealer price). J.A. 260.

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[5] TKPP is tetrapotassium pyrophosphate, $K_4P_2O_7$. J.A. 180. Borax is sodium tetraborate decahydrate, $Na_2B_4O_7 \cdot 10H_2O$.

The 0.24 percent royalty rate set by the master and applied to the bumpers made by GM using soap-borax and soap-TKPP lubricants totalled about $5.7 millions. J.A. 260, 278. This sum vastly exceeded the amounts paid by Houdaille and others for rights under the patent. For example, Plaintiffs' predecessors had purchased the patent in 1955 for $100,000. J.A. 243. Houdaille, Ford Motor Company, and others purchased rights under the patent for sums ranging from $2,500 to $250,000. J.A. 246-7.

Devex attempted to multiply the damages award by accusing GM of bad faith and reckless conduct. The master directed his attention to the charge and found that "the history of the case and the record in its entirety impel me to conclude that defendant acted in good faith and not recklessly." J.A. 209.

Devex sought prejudgment interest from the time each infringing process was used. It requested that such interest be charged at the prevailing bond rate for each year up to the date of judgment, rather than the legal rate. The master decided this issue in favor of Devex. J.A. 261.

The district court made two changes in the master's recommended judgment. First, the court held that the neutralizing rinse processes infringed. J.A. 289-91. It considered that claim 4 covered any process where borax or "equivalent" enters the lubricant in any amount regardless of the intent or actual effect, provided only that the work is cleaned after forming. Second, it increased the reasonable royalty rate on the bumper processes by half, thus assessing 0.75% of the OEM price (0.36% of the dealer price). J.A. 293. This was the "too high" royalty rate which the entire industry had been offered — and rejected — when Devex was in its strongest bargaining position.

The district court entered judgment for damages of $8,813,945.50, distributed as follows (J.A. 301, 673):

1. Borax bumper manufacture (essentially 1964 and earlier)	$4.06 millions (46 percent)
2. TKPP bumper manufacture (1964 and after)	$4.53 millions (51 percent)
3. Borax neutralizing rinse bumper manufacture, accused practice 43 (1962-3)	$0.22 millions (2 percent)

Interest was awarded in the amount of $10,912,291.05, based on Moody's Corporate Bond averages computed from the dates of process usage. J.A. 269-70.

e. The Ruling Below.

The ruling of the Court of Appeals for the Third Circuit, now before this Court, specifically approved the master's fact findings and noted that the district court had also approved them. J.A. 322. The judgment, as modified by the District Court, was affirmed. J.A. 323, 340.

The Court of Appeals affirmed the award of mandatory prejudgment interest. J.A. 335. There was no reference to exceptional circumstances, or even a balancing of the equities. The sole basis for the prejudgment interest award was — "To do otherwise ... would give the defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs" and would encourage defendants in other cases to draw out litigation for as long a period as possible. J.A. 336-7. These reasons exist in any patent case, irrespective of the good faith of the infringer or the bad faith of the patent owner.

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SUMMARY OF ARGUMENT

Interest was first referred to in the patent statutes in 1946. Previously, court decisions had disallowed interest on infringer's profits or reasonable royalties damages until judgment was liquidated, so long as the defense was in good faith and not reckless. The controlling decision on reasonable royalty judgments was *Duplate Corp. v. Triplex Safety Glass Co.*, 298 U.S. 448, 459 (1936). This Court there held that in the absence of "exceptional circumstances", interest on such a judgment does not start until the date damages are liquidated. From the *Duplate* facts, and other decisions of this Court, it was clear that "exceptional circumstances" could not exist in the absence of a finding that the defendant acted in bad faith or was reckless.

As passed by the House, the bill leading to the 1946 Patent Act required interest "from the time the infringement occurred." 92 Cong. Rec. 1857, 79th Cong. 2d Sess., Mar. 4, 1946. The Senate deleted this mandatory interest provision and substituted "... interest, as may be fixed by the court ..." 92 Cong. Rec. 9187-8, 79th Cong., 2d Sess., July 17, 1946, Exhibit II, this brief. The Senate version of the bill was then accepted by the House. 92 Cong. Rec. 9881, 79th Cong., 2d Sess., July 24, 1946. It became law on August 1, 1946. 92 Cong. Rec. 10649, 79th Cong., 2d Sess.

The 1946 Patent Act categorically rejected mandatory prejudgment interest and adopted in its place language consistent with *Duplate v. Triplex*. As discussed below, the courts have continued to follow *Duplate*.

Considerations unique to patent cases gave the Congress special reason to adhere to *Duplate v. Triplex*. The Patent Office cannot avoid issuing invalid patents. Court surveillance is essential before a patent becomes an established, substantial, monopoly — especially where there is a good faith nonreckless defense. But court review cannot materialize unless the accused infringer defends. There are strong incentives on the accused infringer to license or otherwise avoid the litigation. The presumption of validity favors the patentee, litigation expense is unavoidable, key personnel are tied up in litigation. Advance notice that interest will not be assessed, provided the defense is in good faith and not reckless, tends to offset these obstacles, particularly since interest is normally substantial. The decisions of this Court in *Hartford-Empire Co. v. U.S.*, 323 U.S. 386 (1945), and *Hazel-Atlas Glass Co. v. Hartford-Empire Co.*, 322 U.S. 238 (1944), involved Sherman Act violations and previously unexposed fraud on the Patent Office resulting from licenses taken rather than continued resistance to patent charges. Mindful of these and other events, the Congress declined to tilt the scales still farther in favor of the patentee.

Congress again addressed the interest statute when 35 USC 284 was enacted as a part of the 1952 Patent Code. The Code is the carefully crafted result of an in-depth review of the patent statutes. Where Congress thought guidelines to the courts were desirable, they were expressed. See, e.g. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Where the Congress intended to change the law, as in Section 271, it did so. *Dawson Chemical Co. v. Rohm and Haas*, 448 U.S. 176, 213-6, 238 (1980). As enacted, Section 284 left the law where it stood by repeating almost exactly the language of the 1946 Patent Act. This language excludes mandatory interest. But, consistently with *Duplate*, it permits discretionary award of interest after there has been a finding of bad faith or reckless conduct by the infringer.

A few decisions, notably the Second Circuit decision in *Georgia-Pacific Corp. v. U.S. Plywood-Champion*, 446 F.2d 295 at 302 (1971), have indicated by dictum that 35 USC 284 permits a somewhat broader exercise of discretion ". . . although the question is not free from doubt." But where interest has been allowed in these cases, exceptional circumstances have been present and the exercise of discretion has been within the framework of the *Duplate* rule.

If 35 USC 284 should be broadened in accordance with the dictum in *Georgia-Pacific* "to grant the trial court its traditional discretionary power in equity", prejudgment interest would still be improper in this case. The trial court's "traditional discretionary power in equity" requires a balancing of the equities for and against each party. As shown by the found facts and indisputable record facts, these equities are overwhelmingly in favor of GM.

The judgment should be reversed and interest allowed only from the date the damages were liquidated by the master's report.

ARGUMENT

I.

In Duplate v. Triplex, This Court Settled the Law on Interest in Reasonable Royalty Patent Cases

In *Duplate Corp. v. Triplex Safety Glass Co.*, 298 U.S. 448, 459 (1936), this Court addressed the question of when interest should commence on reasonable royalty damages for patent infringement. In that case, the lower courts had awarded prejudgment interest from the date of last infringement, not the later date when damages were liquidated by the master's report. *Duplate Corp. v. Triplex Safety Glass Co.*, 81 F.2d 352, 358 (3d Cir., 1935); *Triplex Safety Glass Co. v. Duplate Corp.*, 10 F. Supp. 420, 425 (W.D. Pa., 1934). There was no finding that the defendant acted in bad faith or was reckless. Reversing, this Court held that "if . . . an award of damages upon the basis of a reasonable royalty becomes appropriate again, we think that interest should run from the date when the damages are liquidated, and not, as by the present decree, from the date of last infringement'' because there ''are no exceptional circumstances justifying a departure from what is at least the general rule.'' 298 U.S. at p. 459.

The meaning of ''exceptional circumstances'' is illuminated by the facts in *Duplate v. Triplex*, and by the earlier decisions of this Court. There was no finding in *Duplate v. Triplex* that the defendant had been reckless or in bad faith. And in *Tilghman v. Proctor*, 125 U.S. 136, 161 (1888), this Court stated that:

> ''. . . At the time of the infringement, the fundamental questions of the validity and extent of Tilghman's patent were in earnest controversy and of uncertain issue. Interest should have been allowed . . . only from the day when the master's report was submitted to the court . . .''

In these and other cases, the judiciary divided the patent cases into three categories. First, where the complainant showed an established and therefore liquidated royalty, interest was allowable from the dates when royalties would have been paid under a license based on that royalty. *Swan Carburetor Co. v. Nash Motors Co.*, 133 F.2d 562, 567 (4th Cir., 1943).[7] Second, when the judgment was for an unliquidated amount, such as reasonable royalties, and there was no finding that the defendant had acted in bad faith or recklessly, interest was allowable only from the date of liquidation — usually the date of the master's report on the accounting. *Duplate Corp. v. Triplex*, supra. Third, if the defendant was found to have acted in bad faith, or recklessly, the court in its discretion could award interest from a date prior to liquidation of damages. *C & O R.R. v. Kaltenbach*, 124 F.2d 375, 377 (4th Cir., 1941).

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[7] In *Swan Carburetor*, supra, an established royalty was shown, but the lower court allowed interest only from the date of a patent-validating holding which occurred after infringement commenced. The Court of Appeals held that the good faith of the defendant did not warrant a departure from the general rule that ''interest on damages ascertained on the basis of an established royalty runs from the time when the royalty should have been paid.'' 133 F.2d at 567.

Reasonable royalty damages for patent infringement are conspicuously unpredictable. They cannot be known and are not liquidated until each royalty bearing product or process is identified and the reasonable royalty rate is ascertained. This case is a vivid example, as discussed below.

Duplate v. Triplex was clearly a sound recognition of the unliquidated character of a reasonable royalty and correctly limited interest to the date of liquidation, in the absence of special circumstances.

II.

35 USC 284 and Its Predecessor, the 1946 Patent Act, Adopted the *Duplate* Decision on Interest.

a. In the 1946 Patent Act the Congress Rejected Mandatory Interest.

The 1946 Patent Act amended Section 4921, R.S. in several respects. Act of August 1, 1946, c. 726, 60 Stat 778. The major change was elimination of the infringer's profits as a basis for a money award, thus limiting the patentee to his damages. This Court considered the Act in *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377, U.S. 476, 504-507 (1946). After examining the history of the Act, the decisions, and commentary on it, this Court observed that there "can be no doubt that the amendment succeeded in effectuating this purpose."[8] 377 U.S. at p. 506.

The bill as passed by the House required the award of "interest from the time the infringement occurred". 92 Cong. Rec. 1857, 79th Cong., 2d Sess., March 4, 1946. But this mandatory provision was deleted by the Senate and in its place the bill was changed to read ". . . such costs, and interest, as may be fixed by the court.". 92 Cong. Rec. 9187-8, 79th Cong., 2d Sess., July 17, 1946. Exhibit II, this brief. The House thereafter accepted the bill as amended by the Senate. 92 Cong. Rec. 9881, 79th Cong., 2d Sess., July 24, 1946. The bill in the Senate form became the law on August 1, 1946. 92 Cong. Rec. 10649.

Plainly, the Congress considered and rejected mandatory prejudgment interest in patent cases. It follows that 35 USC 284, which uses substantially the language of the 1946 Patent Act, cannot be construed to require interest. The court below has in effect construed 35 USC 284 as if it required "interest from the time the infringement occurred" — the language rejected by the Senate and dropped from the 1946 Patent Act (and 35 USC 284). This was done by assigning reasons (use of the money by the defendant and encouraging other defendants to draw out litigation) applicable to any case and therefore requiring an interest award in every case. Since the Congress rejected the proposed statute with such requirement, the judgment below is irreconcilable with the action of Congress and should be reversed.

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[8] And see: Hearings, Recovery in Patent Infringement Suits, H.R. 5231, 79th Cong., 2d Sess., Jan. 29, 1946; H.R. Rep. 1587, 79th Cong., 2d Sess., Feb. 19, 1946, to accompany H.R. 5311; S. Rep. 1503 (Calendar 1529) 79th Cong., 2d Sess., June 14, 1946.

b. In the 1946 Patent Act the Congress Adopted the Existing Decisions on Patent Infringement Interest.

Knowing that there was already a well-developed body of judicial decisions on interest, including *Duplate v. Triplex*, supra, the Senate adopted the existing body of law by language broadly covering the decisions and without directions or standards.

There is no suggestion in the legislative history or the text of the 1946 Patent Act that Congress intended to change the existing developed decisional law on interest on unliquidated patent infringement damages. The evidence is all the other way. Indeed, the chairman of the Senate Committee which originated the amendments stated that after the amendments two changes, neither involving interest, were all the bill proposed to make. Appendix II, this brief, a-4; 92 Cong. Rec. 9188, 79th Cong., 2d Sess., July 17, 1946.

c. The Congress Again Rejected Mandatory Interest and Again Adopted the Existing Judicial Practice by Passage of 35 USC 284.

Present 35 USC 284 is a part of the Patent Code, enacted in 1952. Public 593, 82nd Cong., 2d Sess., Chap. 950, 66 Stat. 792, approved July 19, 1952. In Section 284, the Congress rewrote and combined provisions of former sections 4919, R.S., and 4921, R.S. The language pertinent to interest is almost the same as that of the 1946 Patent Act, namely that:

> "... the court shall award ... damages adequate to compensate for the infringement ... together with interest and costs as fixed by the court."

Like the 1946 Act, 35 USC 284 authorizes interest by language encompassing the existing decisions and it states no standards by which the courts should make determinations in individual cases. Like the 1946 Act before it, the 1952 statute reflects a Congressional intention for the courts to follow the prior decisions.

The 1952 Patent Code importantly changed many parts of the patent law. One example is Section 271, considered by this Court in *Dawson Chemical Co. v. Rohm and Haas*, 448 U.S. 176, 213-6, 238 (1980). All members of this Court there agreed that the section overturned this Court's earlier *"Mercoid I"* decision to at least some degree (*Mercoid v. Mid-Continent Inv. Co.*, 320 U.S. 661 (1944)). Other provisions of the Code altering the prior law are identified in the House Report on the Code (Report 1923, 82nd Cong., 2d Sess., May 12, 1952, to accompany H.R. 7794) and the commentary by P.J. Federico contained in preface to the Code, West Edition.[10]

In some instances, sections of the Patent Code articulated the decision-making process to be followed by the courts without making changes from this Court's judicially-developed law. The major example is Section 103, which was the first statutory expression of the unobviousness requirement. As was held in *Graham v. John Deere Co.*, 383 U.S. 1, 15-18 (1966), this section of the code embraced this Court's prior decision in *Hotchkiss v. Greenwood*, 11 How. (52 U.S.) 248 (1851), while stating the basic factual inquiries to be pursued by the courts on the matter. Id. at p. 17. This Court also noted that the Congress by Section 103 abolished the test some believed to exist in the "flash of creative genius" expression used by this Court in *Cuno Corp. v. Automatic Devices Corp.*, 314 U.S. 84 (1941).

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[10] E.g. Section 112 (last para.); Section 116 (last para.); Section 118; Section 119 (21 para.); Section 120; Section 121; Section 135; Section 146; Section 251; Section 252; Section 253 (second para.); and Section 256.

The Patent Code was not perfunctory "codification". To be sure, many controversial proposals were deferred for further consideration. H.R. Rep. No. 1923, 82d Cong., 2d Sess., to accompany H.R. 7794, May 12, 1952 at 3. But the many substantive changes in the law and expressed guidelines for court application of existing law throw into sharp focus the reenactment in 35 USC 284 of the interest provision contained in the 1946 Patent Act. This, coupled with the clear weight of the judicial decisions in the 30 year period since the Code, confirms the continued validity of *Duplate v. Triplex*.

d. The Congress Had Special Reasons, Specific to Patents, to Retain Duplate v. Triplex.

Patent litigation is not just a matter of private rights. Good faith, nonreckless, defenses to patent charges are an essential element of the patent system. Such defenses prompt the vital judicial scrutiny that should precede any significant established patent monopoly where a good faith, nonreckless defense exists. The Patent Office cannot avoid issuing invalid patents. It is compelled to accept every patent application. It must examine as best it can, based on the prior art investigation permitted by its limited resources. Proceedings are *ex parte*. Pertinent information, such as prior invention and prior public uses, is usually unknown to the Patent Office. Inevitably there is a "notorious difference between the standards applied by the Patent Office and by the Courts" in determining patentability. *Graham v. John Deere Co.*, 383 U.S. 1, 18 (1966). Patents today issue for a "shadow of a shade of an idea", as they did years ago. *Atlantic Works v. Brady*, 107 U.S. 192, 200 (1882).

This Court long ago observed that it is "as important to the public that competition should not be repressed by worthless patents, as that the patentee of a really valuable invention should be protected in his monopoly . . ." *Pope Mfg. v. Gormully*, 144 U.S. 224, 234 (1892). This Court there struck down a series of agreements which foreclosed challenges to patent validity. Prior to 1946, this Court had similarly held that a price fixing licensee should be free to challenge patent validity. *Sola Electric Co. v. Jefferson Co.*, 317 U.S. 173 (1942). More recently, this Court has extended the principle to preclude licensee estoppel entirely because it "muzzles" challenges to patent validity. *Lear, Inc. v. Adkins*, 395 U.S. 653, 670 (1969).

Court surveillance of patents cannot materialize unless accused infringers challenge dubious patents and questionable infringement charges. Such challenge is not automatic. Business enterprise acts in its own self-interest. The certain expenses and uncertain outcome of a patent defense are never lightly assumed. As this Court has observed ". . . patentees are heavily favored as a class of litigants by the patent statute." *Blonder-Tongue Labs v. Univ. of Illinois Res. Found.*, 402 U.S. 313, 335 (1971). A major such preference is the presumption of patent validity, 35 USC 282. Decisions of this Court prior to the statute were to the same effect. E.g. *Mumm v. Jacob E. Decker & Sons*, 301 U.S. 168, 171 (1937).

Further, the prospective defendant must undertake an expensive prior art search and its scarce technical and management personnel are tied up in unproductive court activities. These obstacles generate a strong stimulus to take a license, or just not compete. Disallowance of interest until the judgment amount is liquidated — provided the defenses are in good faith and not reckless — significantly offsets the patentees' advantages. Since prejudgment interest, if allowed, is usually large, the effect is substantial.

The "exceptional circumstances" rule of *Duplate Corp. v. Triplex Safety Glass Co.*, supra, stands with other decisions of this Court in offsetting constraints to defending dubious patent infringement charges. The rule is selective in just the respect it ought to be, for the accused party gains no license to advance defenses in bad faith or recklessly. The patentee still can recover the principal amount of the reasonable royalty damages, if his case is indeed meritorious. And, at the same time, the public interest is preserved.

e. Except for the Ruling Below in This Case, the Lower Court Decisions Under 35 USC 284 Require Bad Faith, Reckless Conduct for Prejudgment Interest.

In *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 505-6 (1964), this Court quoted from the House committee report on the initial version of the bill that led to the 1946 Patent Act. HR Rep. 1587, 79th Cong., 2d Sess., Feb. 19, 1946, to accompany HR 5311. The quotation inadvertently included the clause "together with interest from the time infringement occurred". The lower courts which have analyzed the statutory history and the quotation have recognized that this was error, and have disregarded the language quoted because it was what the Congress rejected, not what it passed. *Georgia-Pacific Corp. v. U.S. Plywood-Champion*, 446 F.2d 295, 301 (2d Cir., 1971); *Wahl v. Carrier Mfg. Co., Inc.*, 511 F.2d 209, 214-5 (7th Cir., 1975).

Recognizing that the Congress intended the courts to continue application of *Duplate v. Triplex*, supra, nearly all reasonable royalty Court of Appeals decisions since the 1946 Patent Act have expressed views consistent with *Duplate v. Triplex*. *CBS v. Zenith Radio Corp.*, 537 F.2d 896, 897-8 (7th Cir., 1976); *Wahl v. Carrier Mfg. Co., Inc.*, 511 F.2d 209, 214-5 (7th Cir., 1975); *Radiator Specialty Co. v. Micek*, 395 F.2d 763, 764-5 (9th Cir., 1968); *Wm. Bros. Mfg. Co. v. Gibson-Stewart Co.*, 312 F.2d 385, 387 (6th Cir., 1963); *Union Carbide Corp. v. Graver Tank*, 282 F.2d 653, 676-7 (7th Cir., 1960); *Russell Box Co. v. Grant Paper Box Co.*, 203 F.2d 177, 180-1 (1st Cir., 1953); *Dixie Cup Co. v. Paper Container Mfg. Co.*, 169 F.2d 645, 651 (7th Cir., 1948). And see *H. K. Porter Co. v. Goodyear Tire and Rubber Co.*, 536 F.2d 1115, 1124 (6th Cir., 1976).

However, the Court of Appeals for the Second Circuit has stated in dictum that the "hoary interest rule" of *Duplate v. Triplex* no longer applies. *Georgia-Pacific Corp. v. U.S. Plywood-Champion*, 446 F.2d 295, 302 (1971). Instead, that court said that the statute made prejudgment interest under 35 USC 284 a matter of "traditional discretionary power in equity," without requiring "exceptional circumstances." The court pointed to no statement in the language of the statute, or its history, referencing discretionary power in equity. In fact, the court conceded that the matter was not free from doubt.

The result reached in *Georgia-Pacific*, however, was quite consistent with *Duplate v. Triplex*, since the court did find exceptional circumstances. It specifically relied on the infringer's reckless conduct. 446 F.2d at p. 302. That conduct included a complete disregard of the prior holdings of patent validity and infringement in *U.S. Plywood Corp. v. Zeesman Plywood Corp.*, 84 F. Supp. 78 (S.D.Cal., 1949), 92 F. Supp. 336 (S.D.Cal., 1950). See *Georgia-Pacific Corp. v. U.S. Plywood*, 258 F.2d 124, 133 (2d Cir., 1957). Other court of appeals decisions have referred to interest under 35 USC 284 as discretionary, but the results reached would not have been different under *Duplate v. Triplex*, supra; *Foster v. AMF*, 492 F.2d 1317, 1324 (2d Cir., 1974); *General Electric Co. v. Sciaky Bros., Inc.*, 415 F.2d 1068, 1076-7 (6th Cir., 1969); *Milgo Electronic Corp. v. United Business Comm., Inc.*, 623 F.2d 645, 668 (10th Cir., 1980).

In the present case the court ignored *Duplate v. Triplex* to reach a contrary decision. The decision stands alone both on the views expressed and on the facts. The court referred to the interest award running from the dates of infringement as "not an abuse of discretion". J.A. 335. But the supposed exercise of discretion was based only on the generalized and always-applicable reasons that denial of interest gives the defendant the use of the money and may encourage defendants in other cases to draw out litigation. J.S. 336-7. This is not the exercise of discretion. *Steinmetz v. Allen*, 192 U.S. 543, 561-2 (1904). On the contrary, such always-present considerations amount to the same absolute rule that the Congress rejected with the "interest from the time the infringement occurred" language of the bill that, with such language deleted, became the 1946 Patent Act.

III.

GM's Conduct Here Has Been Found to be in Good Faith and Not Reckless

The Special Master managed this case for a six-year period. He was not only intimately familiar with the conduct of the parties during that time, but in addition he reviewed and assessed the prior proceedings, particularly in formulating his infringement views and in dealing with the litany of contentions advanced by Devex in support of their claims to multiple damages and attorney fees under 35 USC 284 and 285. After carefully considering Devex's many charges, he found that:

> "Having considered plaintiffs' various submissions, the history of the case and the record in its entirety impel me to conclude that defendant acted in good faith and not recklessly." J.A. 209.

The court below noted that the district court decided that none of the Special Master's fact findings were clearly erroneous, and itself agreed with that determination. J.A. 322.

This fact finding should preclude the award of interest here. Whatever the reasons for the prolonged course of this suit, bad faith or reckless conduct by GM is not one of them.[11]

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[11] The master specifically commented on GM's extensive efforts in framing the pretrial order, saving weeks of testimony and eliminating much controversy. J.A. 197 (fn.).

IV.

If 35 USC 284 Should be Broadened in Accordance With the Dictum in *Georgia-Pacific*, Prejudgment Interest Would Still be Improper in This Case.

Under *Duplate v. Triplex*, "exceptional circumstances" must be found before equitable discretion may be exercised in fixing the date of interest. However, the opinion of the Second Circuit in *Georgia-Pacific Corp. v. U.S. Plywood-Champion*, supra, suggests in a dictum that such discretion may be exercised in the absence of a finding that the infringer acted in bad faith or recklessly. In the present case, the record compels denial of interest prior to liquidation of damages even if the dictum in *Georgia-Pacific* is followed, for the exercise of discretion requires a balancing of the equities and here all the equities are against such interest.

The finding here — approved by the courts below — is that GM acted in good faith and not recklessly. There is no such finding with respect to Devex, and the undisputed facts of record establish repeated acts of inequity.

Due to overreaching by Devex, claim 4 overclaims the invention by literally covering all "inorganic compounds". At the validity trial, Devex sought to save the claim by singling out borax and emphasizing its properties. But it did not abandon "inorganic compound" as the definition of claim scope. Its reply brief specifically stated that "If defendants wish to avoid infringement of claim 4, all they need to do is refrain from adding borax *or other inorganic solid compounds* to the soap". J.A. 766 (emphasis added).

The district court disagreed with Devex and held that claim 4 was literally met by a prior art patent disclosing the claim 4 process with an "inorganic compound" listed in Table I of the patent. J.A. 32-4, 371. On appeal, Devex then not only emphasized the properties of borax as the vitalizing ingredient, but in addition it stated in its brief that "If defendants want to avoid infringement, all they need to do is leave out the borax". J.A. 472.

The Court of Appeals for the Seventh Circuit validated the claim. Its subsequent opinion in the *Houdaille* case removes any possible doubt as to the telling effect of the Devex representation. That opinion specifically states that the trial court holding that claim 4 was met by the prior art would have been affirmed, had the claim been literally construed. J.A. 95.

This Court has prohibited any attempt to save unduly broad claims from invalidity by rewriting them to exclude matter that they unambiguously cover. In *Graver Tank v. Linde Air Products Co.*, 336 U.S. 271 (1949), this Court held the claim invalid, rather than rewrite the claim, in a situation virtually identical with this case. This Court there pointed out that the claims failed to "perform their function as a measure of the grant when they overclaim the invention", and "when they do so to the point of invalidity and are free from ambiguity which might justify resort to the specifications, we agree with the district court that they are not to be saved because the latter are less inclusive." 336 U.S. at 277.

Our primary interest now is not whether claim 4 should have been invalidated by the Seventh Circuit. Rather, it is the effect of the Devex representation on infringement and its subsequent conduct in weighing the equities between the parties in relation to prejudgment interest. Devex at least had an equitable duty, when the Seventh Circuit rewrote the claim at its urging, to avoid taking advantage of GM's reliance on those representations. This it did not do. GM adopted the TKPP bumper processes while Devex seemingly was adhering to the claim as rewritten. Devex changed its mind on venue and transferred this case to another circuit. Decision on the issue of lubricants not containing borax did not come until November 8, 1967. And it was then a vindication of GM. J.A. 757 at 761. While the decision was modified on May 23, 1968, the damage was done, for GM's TKPP bumper process uses were then largely history, the patent was near expiration, and GM's position was irretrievable. J.A. 101.

This is not a case where the damages-creating bumper process uses were unavoidable. The master found that GM could have satisfactorily used outside-the-patent cold forming processes. J.A. 214-32. He also found that GM in fact did make bumpers outside the patent throughout the patent lifetime. J.A. 214. But as the result of Plaintiffs' overclaiming, followed by a narrowed construction defining infringement as requiring borax and then by a repudiation of this narrowed construction, GM bumper processes were brought within the patent too late for GM to have exercised the choice it should have enjoyed of terminating the process uses before damages were substantial.

The record of this case is not one of a plaintiff seeking a just, speedy, and inexpensive determination of the action. On the contrary, the case was filed in the Northern District of Illinois where venue did not exist — and almost a decade after the case was filed it was transferred on Devex's motion to the District of Delaware. J.A. 473. Devex overclaimed the invention. It built on the resulting claim deficiency by first limiting the claim to borax to save validity, and then repudiating that limitation to cover other inorganic compounds. By the time of the accounting trial, Devex had expanded the claim essentially back to its original, invalid, scope. Processes were accused where there was little or no cleaning, and the ease of cleanability supposed to result from the borax coaction was not involved. J.A. 186-90. Devex made the accounting trial even more massive by an extended process-by-process proof of alleged "savings and gains" on non-bumpers, even though warned in advance that such comparison based on machining or hot forging was unwarranted. J.A. 515 at 520-1.

The result was a long-delayed judgment and unnecessary accounting trial proofs. In the end Devex achieved no damages judgment at all on 75% of the accused processes. And the damages awarded for bumper processes were not based on the unjustified time-consuming Devex attempt to prove that GM had no effective cold forming alternative to the "Henricks process" and the reasonable royalty that might be based on such assumption. On the contrary, the damages were calculated from the unacceptable license proposals made by Devex (which the master found to be at "too high" a royalty). J.A. 250-60. The judgment cannot be viewed as a long-delayed vindication of a consistent and reasonable position taken by Devex. On the contrary, it is the residuum of over-reaching, largely rejected, and time-consuming contentions. It reflects an equity against Devex and against adding interest to the judgment.

CONCLUSION

Prejudgment interest prior to the master's report should not have been decreed. The judgment below should be reversed.

Respectfully submitted,

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July 8, 1982

EXHIBIT I

The following information is provided by General Motors Corporation pursuant to Supreme Court Rule 28.1: All U.S. and Canadian subsidiaries of General Motors Corporation are wholly owned with the exception of Motor Enterprises, Inc., which is partly owned by the U.S. Small Business Administration.

Foreign subsidiaries in which a private person could have a financial interest are as follows:

1. Fabrica Colombiana de Automotores S.A.
2. Gemeinnutzige Opel Wohnbaugesellschaft Mit Beschrankter Haftung
3. General Motors Acceptance Corporation, Nederland N.V.
4. General Motors de Colombia S.A.
5. General Motors Iran Limited
6. General Motors Kenya Limited Industrial Commercial Development Corporation
7. General Motors Korea Co., Ltd.
8. General Motors Pilipinas, Inc.
9. GM Allison Japan Limited
10. Industrija Delova Automobila, Kikinda
11. Isuzu Motors Limited
12. Isuzu Motors Finance Co., Ltd.
13. Saudi American Machinery Maintenance Company (SAMMCO)
14. Packard Electric Ireland Limited
15. RADIO FIDUCIAIRE, S.A.

16. Saehan Motor Company, Limited
17. Transfin (Proprietary) Limited

Some of the processes accused as infringements were performed by Defendant using materials purchased under indemnity agreements with one or more of the following:

1. Amchem Products, Inc.
2. Bethlehem Steel Corporation
3. Braun Engineering Company
4. Colt Industries, Inc.
5. LTV Corporation
6. National Steel Corporation
7. Occidental Petroleum Corporation
8. Pennwalt Corporation
9. Republic Steel Corporation
10. United States Steel Corporation

EXHIBIT II

CONGRESSIONAL RECORD — SENATE

JULY 17, 1946

[9187] Ascertainment of Damages in Patent Infringement Suits

MR. PEPPER. Mr. President, I ask unanimous consent that the Senate revert to Calendar No. 1529. House bill 5311, a patent bill, which has previously been passed over. I was out of the Chamber when that meausre was reached during the call of the calendar, [9188] and I understand that objection to consideration of the bill was made because no explanation of it was made at that time. I should like to explain the bill.

Mr. President, this is a House bill. It has the unanimous support of the Senate Committee on Patents, and also of the Commissioner of Patents. Essentially it only changes somewhat the basis of recovery in patent infringement suits.

If Senators will examine the committee report, they will see in italics the new language which is proposed to be inserted. The essential change proposed is that the court may award general compensatory damages and lawyers' fees, where the court considers it proper to award lawyers' fees, whereas, under the present law, the court has to determine the profits which may have been made by the infringer, as well as compensatory damages. Except for changing the word "decree" to "judgment" in several places in the act, that is the only change which will be made.

I believe the Senator from West Virginia [MR. REVERCOMB] made the objection. If any further explanation is desired, I shall be glad to try to give it.

MR. REVERCOMB. Mr. President, will the Senator yield?

MR. PEPPER. I yield.

MR. REVERCOMB. I should like to ask for an explanation of House bill 5311 and House bill 5223, both of which deal with proposed changes in the patent law.

MR. PEPPER. That is correct, and I was just explaining House bill 5311. I am afraid I did not make it clear to the Senator from West Virginia that there is carried in the committee report a statement of the change which is proposed to be made in the existing law. The measure is a House bill, and it has been reported unanimously by the Senate Committee on Patents, and is recommended by the Commissioner of Patents, Mr. Ooms.

Let me state what the bill does: Under the present law, if a suit is maintained for the infringement of a patent, the measure of damages is the profit made by the alleged infringer, and also general compensatory damages which might have been suffered by the claimant.

Experience has proved that it is such a difficult accounting matter to determine what the profit of the alleged infringer has been that there is almost always an interminable delay in connection with the recovery sought.

Consequently, the basis laid down by this bill is general compensatory damages which the plaintiff in the suit sustains. Of course, that may include profits, but it is not limited to profits; and it is not necessary to prove profits, if the plaintiff does not find it appropriate to do so.

The bill will also permit opinion and expert evidence to be received by the court. In addition, it awards to the court discretionary power to allow plaintiffs to recover attorneys' fees, if the court considers it proper to allow such recoveries.

MR. REVERCOMB. Mr. President, do I correctly understand that the explanation the Senator has made covers all the changes which the bill proposes to make?

MR. PEPPER. That is correct, except for the changing of the word "decree" to the word "judgment."

MR. REVERCOMB. I withdraw my objection.

The PRESIDING OFFICER. Is there objection to the present consideration of the bill?

There being no objection, the Senate proceeded to consider the bill (H.R. 5311) to amend Revised Statutes, 4921 (U.S.C.A., title 35, Patents, sec. 70), providing that damages be ascertained on the basis of compensation for infringement, which has been reported from the Committee on Patents with amendments.

The first amendment was, on page 2, line 1, after the words "upon a", to strike out "decree" and insert "judgment."

The amendment was agreed to.

The next amendment was, on the same page, line 5, to strike out "royalty therefor, together with his costs and reasonable attorney's fees to be fixed by the court and interest from the time the infringement occurred", and insert "royalty therefor, together with such costs, and interest, as may be fixed by the court. The court may in its discretion award reasonable attorney's fees to the prevailing party upon the entry of judgment on any patent case."

The amendment was agreed to.

The next amendment was, on page 3, line 13, after the words "or a ", to strike out "decree" and insert "judgment."

The amendment was agreed to.

The next amendment was, on the same page, line 19, after the word "wrapper", to strike out "and for each notice required to be furnished to the Commissioner of Patents in compliance herewith a fee of 50 cents shall be taxed by the clerk as costs of suit."

The amendment was agreed to.

The next amendment was, on the same page, line 25, after the word "concluded", to insert "*Provided, however*, That pending causes of action in which the taking of the testimony has been concluded are to be governed by the statute in force at the time of approval of this act as if such statute had not been amended."

The amendment was agreed to.

The amendments were ordered to be engrossed, and the bill to be read a third time.

The bill was read the third time and passed.

Respondent's Brief

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ALEXANDER L. STEVAS,
CLERK

No. 81-1661

In the

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,

Petitioner,

v.

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, Jr., individually and as Executor of the Estate of WILLIAM C. McCOY, deceased, THEODORE A. TE GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TE GROTENHUIS, and KATHARINE M. BASSETT,

Respondents.

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Counterstatement of Question Presented

Was prejudgment interest, awarded both as delay compensation and in the exercise of discretion by the Master and the District Court, affirmed by the Court of Appeals, authorized by the statutory provision (35 U.S.C. 284) for "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty . . ., together with interest and costs as fixed by the court"?

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- I. The Plain Meaning Of The Statute Supports The Judgment 11

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* The plaintiffs in this case are:

Devex Corporation, an Ohio Corporation; Technograph, Inc., a North Carolina Corporation; William C. McCoy, Jr., individually and as Executor of the Estate of William C. McCoy, an Ohio resident; Theodore A. Te Grotenhius, an Ohio resident; Frederick B. Ziesenheim, a Pennsylvania resident; Marjorie Te Grotenhius, an Ohio resident, and Katharine M. Bassett, a Connecticut resident.

The corporate plaintiffs have no subsidiaries.

The defendant is General Motors Corporation, a Delaware corporation.

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,

Petitioner,

v.

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, JR., individually and as Executor of the Estate of WILLIAM C. McCOY, deceased, THEODORE A. TE GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TE GROTENHUIS, and KATHARINE M. BASSETT,

Respondents.

RESPONDENTS' BRIEF ON THE MERITS

Statute Involved

This case involves § 284 of the Patent Statute, 35 U.S.C.:

> Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

Statement of the Facts

A. Nature of the Action

This is a patent infringement action involving Reissue Patent No. 24,017, sometimes called the Henricks or Devex patent. The patent issued March 4, 1952 and expired March 4, 1969.

Claim 4, the only claim of the patent involved, covers a lubricating process used in cold forming metal car parts by pressure.

> The happy result of [the Devex] process is that phosphate, soap and borax work to lubricate the pressure-forming operation, preventing harmful contact between the metal products and the machinery with which they are formed. . . . [The Devex process] is especially beneficial because it may be easily cleaned from the metal product following its formation.

Devex Corp. v. *General Motors Corp.,* 494 F. Supp. 1369, 1372 (D. Del. 1980) (A282).*

B. Prior Proceedings

Claim 4 was held valid, 321 F.2d 234 (7th Cir., 1963 *cert. denied* 375 U.S. 971 (1964). It is also settled that claim 4 was infringed by this defendant in the production of bumpers and cold extruded, non-bumper parts, 467 F.2d 257 (3d Cir., 1972), *cert. denied,* 411 U.S. 973 (1973).

Upon the accounting before a Special Master (Bruce M. Stargatt, Esquire), additional bumper and non-bumper practices were found to infringe, but plaintiffs were awarded a reasonable royalty rate of ½ of 1% on bumper infringement only. The District Court modified this, first by finding, contrary to the Master, that certain accused rinse practices infringed, and, second, by increasing the rate on the infringing sales value of bumpers to ¾ of 1%, for an award to plaintiffs in the amount of $8,813,945.50.

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* "A" refers to the Joint Appendix. (The suffix "a" has been dropped here.)

The District Court accepted the Master's conclusion that no separate royalty should be awarded on cold extruded, non-bumper infringement.

The District Court also accepted the Master's recommendation that interest at prevailing corporate bond rates be paid from dates of infringement commencing in 1956.* Interest in the amount of $11,022,854.97 brought the total amount of the judgment to $19,836,800.47.

Both sides appealed to the United States Court of Appeals for the Third Circuit, which unanimously affirmed the judgment of the District Court (A304).

C. Petitions For Certiorari On The Accounting

Both sides filed Petitions for certiorari.

The Supreme Court denied plaintiffs' petition and cross-petition and defendant GM's petition to review validity, infringement, and reasonable royalty issues. The Court granted GM's petition limited to the question whether the patent statute "require[s]" the award of prejudgment interest "on" the award of "damages".*

GM's question is based on two erroneous premises: first: prejudgment interest was awarded below, not necessarily "on" the damage award as GM's question presumes but as an integral part of plaintiffs' "adequate compensation" in accordance with the statutory mandate and second: in any event, the statute expressly permits, as an exercise of sound discretion, even if *arguendo* it does not require, prejudgment interest, in all the circumstances of a case such as this.

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* GM did not object to this method used to calculate the interest nor to the rate (A337, n. 18).

* Subsequently, the Court of Appeals sent its mandate down to the District Court, except for the prejudgment interest issue, and GM paid the $8,813,945.50 principal (A302, ¶ 5(i)).

D. The Master's Report

The Master* found, without any dissent of the parties, that "The only rational way to determine reasonable royalties is by reference to the hypothetical negotiations." (A210, A211). He found, further, "as a matter of fact" that "the results" of such hypothetical negotiations would have been an agreement providing for periodic payments based on a percentage of defendant's sales of infringing bumpers. To this would have been added "interest to the patentee to compensate for the postponed enjoyment of the pecuniary benefits of the invention." Referring to that combination of principal and interest the Master stated: "I find that to be the measure of the reasonable royalty due from defendant on account in the infringement." (A261). Plaintiffs' expert testified to the periodic payments as part of the hypothetical license (R 2710). GM offered no contrary testimony and did not take exception to the Master's finding of fact that the reasonable royalty here had to include compensation for delay in payment.* The District Court and the Court of Appeals each affirmed that interest here was a necessary element in the reasonable royalty for the patent holder. (A298; A312, ¶ 15; A317, ¶ 28; A336, ¶ 70). GM, in its Petition to this Court for certiorari, did not, and in view of the record could not, challenge the finding of fact that such delay compensation was an integral part of the reasonable royalty awarded, and it continues to ignore this finding in its present brief.**

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* As the Court of Appeals' Opinion noted:

"39. The Special Master heard testimony during fifty-three days of trial. He wrote an exhaustive and thoughtful report, in which he set forth findings of fact based on a careful weighing of conflicting testimony as well as of documentary evidence. The trial judge, after a detailed analysis of the facts, found by the Special Master, and after applying the standard of review set forth in Fed. R. Civ. P. 53(e)(2) (the 'clearly erroneous' standard) to those fact findings, decided that none of the Special Master's findings of fact was clearly erroneous. We agree." (A322)

Even though he included delay compensation as an integral part of the reasonable royalty, the Master also stated (at A265) that he:

> ". . . would rule both as a matter of law and of discretion that interest should run from the date of infringement without regard to whether defendant's behavior warranted multiple damages or attorneys' fees. Any other result would frustrate the compensatory purpose of § 284 and would be inconsistent with the result in other legal settings which are virtually indistinguishable."

The Master set forth four considerations in support of his conclusion. First, he noted that patentees receiving actual or established royalties get prejudgment interest and that to deny plaintiffs such interest would put them in a worse position "for no discernable reason", concluding that "Such apparent arbitrariness of treatment is unfair and makes no sense". (A266).

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* GM argued below that the license might not itself contain an express interest provision, but this is immaterial because, as the Master found, and GM did not challenge, "where the contractual breach consists of a failure to pay a fixed or ascertainable monetary value . . . interest is recoverable from the date payment is due" (A267-268); and specifically in the case of an agreed patent royalty interest runs from the date of non-payment (A265-266).

** GM acknowledged in its Petition (at p. 12) that "The District Court found that none of the Master's fact findings were clearly erroneous", and (at p. 13), that "The Court of Appeals also confirmed all of the Master's fact findings", citing the Opinion of the Court of Appeals (A322, ¶ 39).

Second, he believed that 35 U.S.C. 284 should yield a result consistent with that under 28 U.S.C. 1498 which, even in the absence of any express provision for interest, has long been judicially interpreted to call for pre-judgment interest so as to make the compensation "entire". *Waite* v. *U.S.,* 282 U.S. 508, 509 (1931). (A266-A267).

Third, the Master, noting that the underlying premise of a reasonable royalty is that of a hypothetical negotiated *contract,* observed that prejudgment interest "is more consistent with the contractual rationale of a 'reasonable royalty' than would be a rule disallowing such interest" (A267-A268).

Finally, he concluded that:

> "to the extent that the issue is regarded as purely discretionary the compensatory purpose of § 284 is not well-served by a rule that would deny prejudgment interest, except where the defendant has acted wilfully or in bad faith . . .from the mid-1950's to now the patentee has been deprived of revenues justly due on account of defendant's misappropriation. Meantime, defendant, which fought hard but unsuccessfully to resist plaintiffs' claims, has had the use of monies rightfully belonging to plaintiff. To disallow interest would beatify that inequitable result". A268-A269).

E. The District Court's Decision

Judge Wright, in the exercise of his discretion, followed the Master's recommendation and awarded prejudgment interest on the royalty award, stating:

> "The purpose of this accounting is to determine the actual royalty GM would have paid had it been able

to reach some accord with Devex. The Court calculated this royalty based on payments, coinciding with GM's use of Devex's patent. Indeed, GM has yet to pay anything. Thus, it must now be charged a premium for the additional benefit it has enjoyed from retaining the use of the royalty money over the many years since its first infringement. *To do otherwise would systematically undercompensate patentees* and encourage their infringers to continue fighting lawsuits long after the disappearance of any justification for doing so for the sole purpose of gathering in generous interest money that rightfully belongs to someone else (A297-298)."*

F. The Opinion Of The Court Of Appeals

The Court of Appeals affirmed, holding:

> "The Special Master, affirmed by the District Court, awarded interest (delay damages) at the prevailing corporate bond rate on the royalty payments as of the date those payments became due, calculated yearly (number of infringing parts made each year). On appeal, defendant contends that such an award was improper. We disagree, and hold that *under the facts of this case the award of interest as the yearly royalty payments became due was not an abuse of discretion* (A335)."

The Court of Appeals cited *Aro Manufacturing Co.* v. *Convertible Top Co.,* 377 U.S. 476 (1964) to the effect that "the purpose of the [1946 Amendment of 35 U.S.C. 284 was to award] damages in the amount of a reasonable royalty, plus interest from the time infringement occurred". (A336). The Court of Appeals then stated that "in a case such as this one, 35 U.S.C. 284 itself supports the award of interest from the date of infringement" because it requires that the damages be "adequate to compensate for the infringement". (A336). The Court noted that the Complaint was filed in 1956 and that interest was awarded "for infringement which took place in that year" holding that failure to award such interest would be to "give defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs, and would deprive plaintiffs of money they should have had". (A336-337). Moreover, the Court continued, "a failure to award interest as of the date of infringement would encourage defendants to draw out litigation for as long a period as possible. The only sufferer from such a result would be the prevailing plaintiff—the innocent party". (A337).

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* Emphasis supplied throughout unless otherwise noted.

The Court refused "to rule that the absence of [an established license] rate precludes an award of interest on the facts of this case." (A337-338). The Court held further as follows:

> "Policy likewise dictates this result: failure in a case like this one to award interest as of the date of infringement rewards infringers where those infringers refused to accept or negotiate a royalty and discourages the amicable licensing of patents". (A338).*

Finally, the Court cited the parallel § 1498 under which pre-judgment interest is awarded for patent use by the Government to "accomplish complete justice as between plaintiff and the United States", citing *Pitcairn* v. *U.S.*, 547 F2d 1106 (Ct. Cl. 1976) and *Waite, supra*. (A338-339).

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* The plaintiffs offered a license to the industry, including GM, as early as November, 1964 (A251) and GM had every reason to believe that it could have negotiated a license with the patentee at any time before.

The Court of Appeals concluded:

> "The failure to award interest to plaintiffs here would penalize the prevailing party and reward the infringer for its wrongdoing, and we decline to reach such an inequitable result". (A339).

Summary of Argument

Under 35 U.S.C. 284 the court "shall" award "damages adequate to compensate for the infringement". Damages must be not less than "a reasonable royalty" with "interest and costs as fixed by the court". The plain meaning of the statute, therefore, supports the award of interest from the date of infringement both for "adequate compensation" and as "interest". The Supreme Court approved this interpretation of Section 284, as amended in 1946 and reenacted in 1952, in *Aro Manufacturing* v. *Convertible Top,* 377 U.S. 476 (1964); the Court (505-506) quoted approvingly from the Congressional reports that the basis of recovery was to be "not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages".

Both House and Senate Committees reporting the bill enacted in 1946 stated that its object was to provide adequate compensation, not less than a reasonable royalty, to include "interest from the date of infringement". No spokesman for the bill in either body ever indicated a change in this legislative intent.

The authorities since *Aro* further support the judgment. *E.g.,* in *Georgia-Pacific Corp.* v. *U.S. Plywood,* 446 F.2d 295, 302 (2d Cir. 1971) the court sustained an interest award from date of last infringement as within the District Court's discretion, under the 1946 amend-

ment, even in the absence of a finding of exceptional circumstances

The award was made to give adequate compensation in view of the long delay in plaintiffs' receiving any payment at all, to avoid penalizing the innocent patent holder and to avoid giving the infringer-wrongdoer a windfall. Accordingly, the Master and the courts below overruled the defense of good faith, as the prejudgment interest award was not imposed as a penalty but awarded as delay compensation. Defendant here adamantly refused to take a license on any basis although the patent owner gave it notice it was infringing in 1955 and commenced suit in 1956. GM could have negotiated a license at any time before 1956, from which the interest award dates, since, as the Master held, licenses were the only potential source of income from the patent. (A210).

GM makes up out of whole cloth its contention that Congress had special reasons for not changing the interest rule in 1946. Congress struck the balance when it eliminated profits but awarded interest. It thereby removed the penalty against the good faith infringer by letting him keep his profits but also abolished the penalty against the patent holder by giving him prejudgment interest to make him whole.

As the Court of Appeals noted, the denial of interest "discourages the amicable licensing of patents" which is against the "policy" of the patent system (A338). Such denial is also unsound administration of justice because it encourages the infringer to delay merely to enjoy the use of the money before the day of reckoning (A337).

Under these circumstances there is no reason for this Court to disturb the findings, conclusions and careful exercise of discretion by the Master, the District Court and the Court of Appeals.

ARGUMENT

I

The plain meaning of the Statute supports the Judgment.

The patent statute (35 U.S.C. 284) mandates "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty". That in itself clearly encompasses delay compensation where the courts find, as they did here, that such compensation is in fact a proper part of "adequate compensation" and an integral part of the "reasonable royalty". Adequacy of compensation and the amount of the reasonable royalty are questions of fact, and are thus not subjects for review by this Court, particularly where, as here, such findings have been affirmed by the Court of Appeals as not clearly erroneous.*

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* A "reasonable royalty" is "damages recovered and recoverable in equity", *Georgia-Pacific Corp.* v. *U.S. Plywood,* 446 F.2d 295, 302, n.10 (2d Cir. 1976); interest as delay compensation is not a penalty but an element of such equity damages, *Georgia-Pacific, supra,* at 302; Chief Judge Leahy in *Hartford Nat'l Bank & Trust Co.* v. *E.F. Drew & Co.,* 188 F. Supp. 347, 349 (D. Del. 1966), *aff'd.,* 290 F.2d 589 (3d Cir. 1961), *cert. den.,* 386 U.S. 825 (1961), awarded prejudgment interest to the patent holder for infringement, stating:

> The award of interest, here, is, however, not a punitive device. Allowed interest in this case represents damages for delay in payment and compensation for use of plaintiff's money that should have been included in withheld annual royalty statements which, of course, were never rendered by the infringer. In short, it is moratory interest and not contract or punitive interest.

Moreover, the statute expressly calls for "interest" in the normal course just as for "costs", leaving the amount, of course, to be fixed by the court.*

Thus, the plain meaning of the statute unambiguously supports the judgment on two self-sufficient and mutually reinforcing grounds.

This Court adopted this interpretation of the statute in *Aro Mfg.* v. *Convertible Top,* 377 U.S. 476 (1964). Referring to the 1946 amendment and quoting the House report adopted by the Senate, the Court stated (*Id.* 505-06):

> "The object of the bill is to make the basis of recovery in patent-infringement suits general damages, that is, any damages the complainant can prove, *not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages.*"

An identical view has been taken by the Court in applying 28 U.S.C. § 1498, under which the U.S. Government pays compensation for patent use. In *Waite* v. *United States,* 282 U.S. 508, 509 (1931) the Court stated:

> The statute grants 'recovery of his reasonable and entire compensation for such use.' We are of opinion that interest should be allowed in order to make the compensation 'entire.' . . . we cannot doubt that it was intended to accomplish complete justice as between the plaintiff and the United States.

Interest from date of use is included in the award in such cases as "delay compensation", *See Pitcairn* v. *U.S.,* 547 F.2d 1106, 1120 (Ct. Cl. 1976), even though the statute does not mention interest. The statute at issue here calls for "adequate" compensation, "not less than a reasonable royalty," "together with . . . interest" and thus *a fortiori* supports that allowance of interest from the date of infringement in order to make the patent holder whole.

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* "together with interest and costs as fixed by the court."

Indeed, the provision of pre-judgment interest is now a standard element where the award is designed to provide a plaintiff with full and equitable compensation. *See, e.g., Jacobs* v. *United States,* 290 U.S. 13 (1933): interest from time of the taking is necessary to constitute "just compensation" under the Fifth Amendment."* *See also:*

Southern Pacific Co. v. *Miller Abbatoir Co.,* 454 F.2d 357, 363 (3d Cir. 1972) (prejudgment interest to railroad for services rendered shippers appropriate under 49 U.S.C.A. § 6(7)); *Johns Hopkins University* v. *Hutton,* 297 F.Supp. 1165, 1233 (D. Md. 1968), *modified on other grounds,* 422 F.2d 1124 (4th Cir. 1970) (interest appropriate from date of accrual of claim under Securities Act of 1933); *NLRB* v. *American Compress Warehouse,* 374 F.2d 573, 575 (5th Cir. 1962) (prejudgment interest on back-pay award necessary to make discharged employees whole); *DeFries* v. *Haarhues,* 488 F.Supp. 1037, 1044 (C.D. Ill. 1980) (to like effect under the A.D.E.A.); *Continental Oil Co.* v. *United States,* 184 F.2d 802, 822-23 (9th Cir. 1950) (interest appropriate on court-fixed oil royalties notwithstanding absence of statutory authority, so that Government may be "made whole").*

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* This principle has been most recently applied, in the context of the antitrust laws, in *Catalano, Inc.* v. *Target Sales, Inc.,* 446 U.S. 643, 648 (1980), where the Court held:

> It is virtually self-evident that extending interest-free credit for a period of time is equivalent to giving a discount [from the purchase price] equal to the value of the use of the purchase price for that period of time.

Plainly, without pre-judgment interest here, the infringer would be getting a "discount" from the reasonable royalty, which would mean that the plaintiffs would be getting less than the "reasonable royalty", less than the adequate compensation, mandated by the statute.

Section 284, adopted in 1952, was not intended to change the applicable provision as enacted in 1946 (former 35 U.S.C. § 70—see A2).

The modern approach to interest, exemplified by the Court of Appeals opinion below is reinforced by considering the former language of the patent statute. In its pre-1946 version, § 70 provided merely for "a reasonable sum as profits or general damages for the infringement" (3 Deller's Walker on Patents 2d ed., p. 551). Omitted was any reference to *"interest"*, as well as to *"adequate"* compensation and to *"not less* than a reasonable royalty". In *Tilghman* v. *Proctor,* 125 U.S. 136, 160 (1888), the leading pre-1946 case, the Court noted that the statute as it then read, "made no mention of interest", and adhered to a "general rule" that "profits" do not accrue interest prior to the date of the Master's Report. It was this traditional attitude toward the award of interest that the 1946 amendment was designed to change, thereby leaving no room for doubt regarding the propriety of prejudgment interest whether as part of or added to a reasonable royalty award.

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* A.L.I. Restatement of Restitution, § 157, p. 627:

> "In actions for restitution brought because of a conversion of chattels, the measure of restitution is the value of the chattels, together with, ordinarily, *interest from the time of the conversion.*"

A.L.I. Restatement of Torts 2d § 913 calls for interest to be awarded (p. 488) for

> "harms to pecuniary interest *from the time of the accrual of the cause of action* to the time of judgment, if the payment of interest is required to avoid an injustice."

An instance given (p. 489) for awarding such interest is "when the period of time between the harm and the judgment is long"; see Judge Wright's opinion quoted *supra,* p. 7 and opinion of the Court of Appeals quoted *supra,* p. 8).

Where, as here, the award of damages takes the form of a reasonable royalty payable in periodic installments, plainly, unless the award includes interest from the date each royalty installment was due, the patent holder will receive *"less"* than the reasonable royalty, and hence not receive *"adequate"* compensation, in contravention of the statute as amended. That was the position of the Master, the District Court and the Court of Appeals. The Master stated that denial of pre-judgment interest here "would frustrate the compensatory purpose of § 284" (A265). Judge Wright, likewise, held that a failure to award such interest in this and like cases "would systematically undercompensate patentees" (A298). The Court of Appeals affirmed the award of prejudgment interest as "delay damages" (A335) and applied the statute similarly (A336-337).

II

The legislative history of the 1946 amendment evidences a legislative intent to provide for the award of pre-judgment interest to make the patent holder whole.

The legislative history of the 1946 amendment now embodied in 35 U.S.C. § 284 confirms that the intention of the Congress was to provide for interest from dates of infringement in the usual case of a periodic royalty award. The 1946 amendment as reported out by the House Committee contained a provision giving the successful patent holder "his costs and reasonable attorneys fees to be fixed by the court and interest from the time the infringement occurred."* The House Committee Report stated in pertinent part:

> "The object of the bill is to make the basis of recovery in patent-infringement suits general dam-

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* It originated as HR 5311, and was reported out by HR Rep. No. 1587 (79th Cong. 2d Sess. 1946 Pt. 2).

> ages, that is, any damages the complainant can prove, *not less than a reasonable royalty, together with interest from the time infringement occurred,* rather than profits and damages." (U.S. Code, Congressional Service, 79th Cong. 2d Sess. 1946, p. 1387).

This bill passed the House as reported. Cong. Rec., 79th Cong., 2d Sess. p. 1857.

The Senate Committee expressly "adopted" the House Committee Report "as the report of the Senate Committee on Patents", including the paragraph from the House Report set out above. Although the Senate Committee adopted the House Committee recommendation on interest (S. Rep. No. 1503, 79th Cong. 2d Sess. 1946), it did not agree to making an attorneys fee award mandatory nor to the limiting of that award to the patent holder. Accordingly, the Senate changed the Bill to read that the prevailing patent holder was entitled to "damages . . . together with such costs, and interest, as may be fixed by the court. The court may in its discretion award reasonable attorney's fees to the prevailing party upon the entry of judgment in any patent case." The Senate Report made clear that the purpose of the change was to render the award of attorney's fees discretionary, and not to affect the interest provision of the House bill.

HR 5311, as so modified by the Senate Committee, passed the Senate. Cong. Rec., 79th Cong., 2d Sess. p. 9188. Senator Pepper in reporting the House bill to the Senate expressly noted that it "is a House bill. It has the unanimous support of the Senate Committee on Patents"; and "that there is carried in the committee report a statement of the change which is proposed to be made in the existing law," (79th Cong. 2d Sess., p. 9187; Ex. II to GM Br. a-3 and a-4). Thus, for a full statement of the legislative intent, he referred to the Senate Committee Report which, as noted, expressly ratified the House intent to award interest from date of infringement.

When the bill as modified came back to the House, Congressman Lanham, who managed the bill, explained the Senate changes as follows:

> The Senate amendments do not interfere with the purport of the bill. There is a provision with reference to attorneys' fees and how they shall be paid. (Congressional Record, 79th Cong., 2d Sess., p. 9881).

With that explanation, the House again passed the bill, this time as amended by the Senate (*id.*). The phrase "together with interest and costs as fixed by the court" in § 284, is clearly intended to make compensatory, prejudgment interest on reasonable royalty awards "from the time infringement occurred" the normal rule, just as costs are awarded as a matter of course.*

The effect of the Amendment is correctly stated in 35 U.S.C., see Appendix II, § 70, note:

> 1946 Amendment. Act Aug. 1, 1946 amended section to make the basis of recovery in patent infringement suits general damages, that is, any damages the complainant can prove, *not less than a reasonable royalty, together with interest from the time infringement occurred*, rather than profits and damages.

This legislative note was, of course, before the 1952 codifiers who presumably agreed with, and reenacted it;

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* By contrast to attorneys' fees which the legislative history, see above, shows was intended to be "in its [the court's] discretion. Likewise, the statute as it stood before 1946, and not changed in 1946, provided for a multiple of damages "in its [the court's] discretion" in former § 70.

else, they would have expressed disagreement with it or chosen other language in § 284. This is particularly so inasmuch as language changes were made regarding other aspects of the statute, such as the award of attorneys fees. In contrast to an award of interest, Congress in 1952 specifically provided for an award of attorneys fees only in "exceptional cases" (35 U.S.C. § 285), thus demonstrating its intent not to require "exceptional" circumstances before there is an award of interest.

III

Aro and the authorities since *Aro* further support the judgment.

After *Aro*,* in *Marvel Specialty Co.* v. *Bell Hosiery Mills, Inc.*, 386 F.2d 287, 290 n.3 (4th Cir., 1967), the court referred to the *Aro* decision as follows:

> The legislative history of the 1946 Amendment, as recited in the *Aro* case, *supra*, shows that the sponsors of the bill contemplated the allowance of interest *from the time of infringement.* (Emphasis in original).

The Court of Appeals, below, also relied upon *Aro* and stated (A336):

> Thus, in *Aro* the Supreme Court identified the purpose of the amendment, and stated that it was part of that purpose that damages in the amount of a reasonable

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* Even before the Supreme Court's *Aro* opinion, Chief Judge Leahy had awarded interest on a periodic reasonable royalty from the date of infringement, not as a penalty, but simply to make the patentee whole, affirmed as "well within the court's discretion", *Hartford Nat'l Bank & Trust Co.* v. *E.F. Drew & Co.*, 188 F. Supp. 347 349 (D. Del. 1960); *affirmed*, 290 F.2d 589 (3d Cir. 1961); *cert. den.*, 386 U.S. 825 (1961).

royalty plus interest "from the time infringement occurred" be recoverable.*

In *Georgia-Pacific Corp.* v. *U.S. Plywood,* 446 F.2d 295, 302 (2d Cir. 1971), the Court of Appeals for the Second Circuit sustained a pre-judgment interest award on an unliquidated amount for patent infringement (from date of last infringement), as within the District Court's discretion, even in the absence of a finding of exceptional circumstances.** The Court rejected the argument that by the 1946 amendment "Congress intended no change whatsoever in the existing law respecting interest." That view, said the Court, "fails to give sufficient weight to the specific language which the final bill did add: 'interest . . . as fixed by the court'. We agree instead with the position taken in *Sciaky, supra,* 415 F.2d at 1077, that 'the statutory provision for . . . interest [is] made discretionary with the district judge'". The Court also stated that "indeed, USP [the patent holder] has a persuasive argument that the equities require GP [the infringer] to pay interest from the dates on which royalties would have been paid."

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* Quoting *Aro* in accord:

> *Saf-Guard Products, Inc.* v. *Service Parts, Inc.,* 491 F. Supp. 996, 1011 (D. Ariz. 1980) ("interest" from "the end of each calendar year during the period of infringement"); *Colt Industries* v. *Index-Werke,* 205 USPQ 990, 1006 (D., D.C., 1979) paragraph 59: "interest from the time the infringement occurred"); *W.L. Gore & Associates* v. *Carlisle Corp.,* 198 USPQ 353, 371 (D. Del. 1978) ("compensatory interest on reasonable royalty awards, where necessary to make whole an injured patentee"); and *Corometrics Medical Systems, Inc.* v. *Berkey Bio-Engineering Inc.,* 193 U.S.P.Q. 467, 478 (N.D. Calif. 1977) (Finding 47: "interest from the time infringement occurred").

** GM's statement (Br. 20) that the court relied on exceptional circumstances is contradicted by the Court's statement on the very page GM cites (302, n. 11): "In light of our holding, we find it unnecessary to consider USP's argument that interest from the date of last infringement was proper because the case comes within the 'exceptional circumstances' exception to the *Duplate* rule. 298 U.S. at 459, 56 S. Ct. 792. Moreover, this argument was apparently not made below and no finding was made."

The Courts in all circuits that have spoken since *Aro* have ruled that pre-judgment interest on a reasonable royalty award is appropriate to compensate the patent holder adequately.[*] Only one Court of Appeals, the 7th Circuit, *Wahl* v. *Carrier,* 511 F.2d 209, 215 (1975) has added the proviso that the District Court should find "special circumstances" in order to make such an award. But even that court has undermined the basis for its proviso in a recent decision relating interest to adequate compensation. *In*

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[*] Second Circuit: *Georgia Pacific Corp.* v. *U.S. Plywood,* 446 F.2d 295, 302 (1971); Third Circuit, even before *Aro: Hartford National Bank & Trust Co.* v. *Drew,* 188 F. Supp. 347 (D. Del. 1960) aff'd 290 F.2d 589 (1961) cert. den. 368 U.S. 825; after *Aro: Gore* v. *Carlisle,* 198 U.S.P.Q. 353, 371 (D. Del. 1978); Fourth Circuit: *Marvel Specialty Co.* v. *Bell Hosiery Mills Inc.,* 386 F.2d 287, 290 footnote 3 (1967); District of Columbia: *Colt Industries* v. *Index-Werke,* 205 U.S.P.Q. 990, 1006 (D.C., D.C. 1979); Fifth Circuit: *Abbott* v. *Barretine,* 160 U.S.P.Q. 524, 527 (N.D. Miss. 1968); Sixth Circuit: *G.E.* v. *Sciaky,* 415 F.2d 1068, 1976-7 (1969); Seventh Circuit: *Wahl* v. *Carrier,* 511 F.2d 209, 215 (1975); Ninth Circuit: *Saf-Guard Products Inc.* v. *Service Parts, Inc.,* 491 F. Supp. 996, 1010 (D. Ariz. 1980); *Corometrics Medical Systems, Inc.* v. *Berkey Bio-Engineering Inc.,* 193 U.S.P.Q. 467, 478, finding 47 (N.D. Calif. 1977), cf. the earlier case, *Radiator Specialty Co.* v. *Micek,* 395 F.2d 763 (9th Cir. 1968) where the Court allowed, with an attorneys' fee, treble damages but no interest on the treble damages; Tenth Circuit: *Maloney* v. *Crawford,* 511 F.2d 10, 13 (1975); *Milgo Electronic* v. *United Bus Communications,* 623 F.2d 645 (1980).

In *Maloney* v. *Crawford,* although the Court of Appeals affirmed a denial of pre-judgment interest, the court did so only because "considerable latitude is to be afforded trial courts" (511 F.2d at 14); the Court of Appeals stated that it was "in basic sympathy with [the] position" that the trial court had "erred in not assessing interest from the date of infringement", noting that it was following the Second and Sixth Circuits that an award of interest from the date of infringement is discretionary with the trial court (13-14).

Re Crash Disaster, 644 F.2d 633 (7th Cir. 1981). There it interpreted a Death Act calling for "fair and just compensation", as requiring that the judgment include an element "Augmenting the amount of income flow lost between death and trial". That increment is the same as prejudgment interest but is not called such because the Death statute at issue there did not provide separately for interest. Nevertheless, the court concluded, labelling it "prejudgment interest" was not reversible error.

In the present case, the award was granted in the exercise of discretion, "under the facts of this case" to give adequate compensation in view of the long delay in plaintiffs' receiving any award at all. Indeed the first bumper infringement for which a reasonable royalty was awarded below was 1956, more than 26 years ago. As the Court of Appeals below stated:

> "where, as here, the interest is as much as or more than the royalties, a failure to award interest from the date of the infringement would mean that the losing defendant actually gains from the infringement and the lengthy litigation" (A337, n. 17).

"Special circumstances" is a concept germane to a penalty award, not to adequate compensation for appropriation of plaintiffs' property. Accordingly, although the Court of Appeals affirmed the "ruling that an award of multiple damages and attorneys' fees would not be appropriate in this case" (A340 note), on the ground, apparently, of sufficient good faith to avoid that penalty, that is no reason, as the Court of Appeals correctly held, to "give defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs" (A336). To withhold interest where, as here, it is an essential ingredient of adequate compensation, would be to penalize, in the Court's language, "the prevailing plaintiffs—the innocent party" (A337).*

As the Master noted, the present situation, realistically, is not different from the situations where a license provides for royalties that become defaulted (A265-A266); or where there is an established royalty (*id.*); or where the Government is the user (A266-A267); or where a contract is breached (A267-A268); or where a defendant receives a benefit, but tortiously withholds the price from the plaintiff (A268-A269). In all of these cases, interest is properly imposed from date of the breach, use or wrong as the case may be.

Moreover, since 1956—the date interest commences—to the present—over a quarter of a century—defendant has had the benefit of the reasonable royalties wrongfully withheld. As the Master and the courts below held, equity and fairness require that GM reimburse plaintiffs for that benefit (A336-A337). GM adamantly refused to take a license on any terms, although the patent holder gave it notice it was infringing, in 1955 (A413), commenced suit in 1956, and offered the industry, including GM, a license in 1964 (A291). As the Court of Appeals stated in this connection:

> . . . failure in a case like this one to award interest as of the date of infringement rewards infringers where those infringers have refused to accept or negotiate a royalty, and discourages the amicable licensing of patents (A338).

Judge Wright correctly stated that to deny prejudgment interest here is to "encourage their infringers to continue fighting lawsuits long after the disappearance of any justification for doing so for the sole purpose of gathering in generous interest money that rightfully belongs to someone else" (A298).

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* The Master stated (A265);

"interest should run from the date of infringement without regard to whether defendant's behavior warranted multiple damages or attorneys' fees."

The record here shows dramatic inflation in the pertinent period: e.g. the Consumer Price Index (base: 100 in 1967) rose from 80.4 in December 1955 to 191.5 in April 1978 and the Court will take judicial notice of the subsequent accelerating inflation (A685-686). In federal claims such dramatic inflation must be considered to make the plaintiff whole and prejudgment interest is an appropriate way to take inflation into account. *Sauers* v. *Alaska Barge,* 600 F2d 238 (9th Cir., 1979) (compound interest awarded from date of complaint).

Defendant's distinction between unliquidated and liquidated claims is not applicable here. The 1946 Amendment draws no distinction between liquidated and unliquidated claims. Why, then, read into it a distinction that the Supreme Court recognized to be "not a sound one" as long ago as 1933? *Funkhouser* v. *J.B. Preston Co.,* 290 U.S. 163, 168 (1933). Congress has made no such distinction, and the courts below have wisely refused to sanction one here.*

In truth, all that is involved here is (1) a twice-confirmed and unchallenged finding of fact that delay compensation is an integral part of the adequate compensation mandated by the statute and (2) in any event, an exercise of the sound discretion of the Master and the District Court in determining that on all the facts of this case an award of prejudgment interest is fair and equitable in order to make plaintiffs whole and to avoid a windfall to the tort-feasor. This result is in accord with the statute as amended in 1946, with the legislative history of that amendment and its 1952 reenactment, with the opinion of this Court in *Aro,* and with the subsequent opinions of the lower Federal courts.

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* Accord: *Johns Hopkins University* v. *Hutton,* 297 F. Supp. 1165, 1233 (D. Md., 1968) awarding prejudgment interest:

> "this Court does not believe that Congress intended the hoary distinction between 'liquidated' and unliquidated' claims, criticized by eminent authorty well before 1920, (footnote) to be mechanically applied when such application 'would thwart the compensatory purposes of the remedial legislation set forth in Section 12 [Securities Act, 1933]' ".

In *Graver Mfg. Co.* v. *Linde Co.,* 336 U.S. 271, 275 (1949), this Court held that it does not "undertake to review concurrent findings of fact by two courts below in the absence of a very obvious and exceptional showing of error." Plainly no such showing has been made here. The finding of fact that delay compensation in this case is an integral part of the adequate compensation payable by GM has never been challenged. In any event, exercise of discretion is a sufficient ground to support the award, and the Court of Appeals has found no "clear abuse of discretion". Under such circumstances it would be plainly inappropriate to substitute another judgment for the uniform judgment of the Master, the District Court and the Court of Appeals. See *Piper Aircraft Co.* v. *Reyno,* 70 L. Ed. 2d 419, 436 (1981).

IV

GM's position is unsound in fact and in law.

We submit that GM's Brief is unsound in fact and in law.

GM's argument ignores the plain meaning of the language of the applicable statute, and in that connection ignores the contrasting earlier statute, the parallel statute, and the pertinent Supreme Court cases; *see, supra,* pp. 11-13, 14.

GM's one paragraph summary (Br., 14) of the legislative history leading to the 1946 amendment is grossly misleading. That history is set forth in detail *supra* at pp. 15-18 and shows that Congress clearly intended to make interest payable from the date of infringement, with costs, the normal rule. Contrary to GM's assertion (Br. 19), that legislative history shows that this Court did not "inadvertently", but consciously and correctly, quoted from the House Report, concurred in by the Senate Report (*supra*, pp. 15-16) that interest was normally to run from date of infringement. Thus, in ***Marvel Specialty Co.*** v. ***Bell Hosiery Mills, Inc.***, 386 F.2d 287, 290 n. 3 (4th Cir. 1967), the Court referred to the ***Aro*** decision as follows:

> The legislative history of the 1946 amendment, as recited in the *Aro* case, *supra*, shows that the sponsors of the bill contemplated the allowance of interest *from the time of infringement*. (emphasis in original).

Other cases to like effect are cited above. Indeed GM (Br. 19) miscites *Georgia Pacific Corp.* v. *U.S. Plywood-Champion*, 446 F.2d 295 (2d Cir. 1971), which specifically holds that the 1946 amendment did change the law, eliminating the previous rule that special circumstances had to be shown before pre-Master Report interest could be awarded, *supra*, pp. 19-20.

Again in contrast to GM's assertions (Br., 17), the lower courts that have passed on the issue since *Aro*, with the single exception of the Court of Appeals for the Seventh Circuit, have uniformly held that Pre-Master Report interest may be awarded even in the absence of "exceptional circumstances" such as bad faith or an established royalty, see *supra*, p. 20.

There is no basis for GM's novel assertion that "Congress Had Special Reasons" for not changing the interest rule when it amended the patent statute in 1946 (Br. 17).

There is not a single reference in its Brief to any source showing that Congress had any such "reason". Of course, as GM asserts, the patent system protects challenges to dubious patents, but by the same token, it encourages invention by protecting valid patents and infringement of a valid patent is a property tort, *Carbice Corp. of Amer.* v. *Amer. Patents Develop. Corp.*, 283 U.S. 27, 33 (1931) with the patent holder entitled to full indemnification.

Congress struck the balance in 1946 when it eliminated profits but awarded interest. It thereby removed the penalty against the good faith infringer by letting him keep his profits but also abolished the penalty against the patent holder by giving him interest to make him whole. Award of an infringer's profits was a windfall to the patent holder; but a failure to award interest was a windfall to the infringer. The system violated the principle of indemnification in both respects. Thus, Congress in 1946 restored that principle to the patent system by eliminating both windfalls in the normal case. This, it is respectfully submitted, was the very point of *Aro's* (377 U.S. at 505-6) apt quotation from the legislative history:

> "The object of the bill is to make the basis of recovery in patent infringement suits general damages, that is, any damages that complainant can prove, *not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages.*"

The principle of indemnification was embodied in the phrase "general damages" and its minimum elements were royalty principal, interest for late payment and costs. It would not have been even-handed for Congress to eliminate profits from the award without including interest and no Committee, Senator, or Congressman ever stated that Congress had retreated from the recommendation of both Senate and House Committees that while profits were to be eliminated, interest and costs were to be awarded in normal course.

GM recognizes that it could have taken a license with provision for interest on late payments, and still challenged the validity of the patent; so there is no more connection between allowing challenges to patents and interest than there is between such challenges and any other element of indemnification of the patent holder for infringement of his patent. GM's argument is, let the good faith infringer pay less than adequate compensation until the courts have spoken. GM points to no authority in support of that arbitrary position. Indeed GM concedes that even before 1946 the good faith infringer had to pay the established royalty plus interest from the date of infringement (Br. 12, n.7). As the Court of Appeals noted, the denial of interest "discourages the amicable licensing of patents", which is against the "policy" of the patent system (A338).

As to the cases cited by GM (Br. 19), *Georgia-Pacific* as noted, is contra GM's position *supra pp.* 19-20. Most of the other cases either pre-date *Aro* or are from the Seventh Circuit. The two remaining cases do not support GM's contention. In *Radiator Specialty Co.* v. *Micek,* 395 F.2d 763, 764-5 (9th Cir., 1968), the Court awarded, with an attorney's fee, *treble* damages and, of course, did not award interest thereon. In *H.K. Porter Co.* v. *Goodyear Tire and Rubber Co.,* 536 F.2d 1115, 1124 (6th Cir. 1976) the Court of Appeals merely affirmed an interest denial without casting doubt on its rule in *Sciaky* that the matter was within the trial judge's discretion.

GM's contention (Br. 21), that the finding that it acted in good faith and not recklessly in defending against plaintiffs' claims requires denial of interest, was expressly rejected by the Master (A268-A269), the District Court (A297-A298) and the Court of Appeals and is unsound in law, particularly since the 1946 amendment. *See, supra,* pp. 21-22. Interest, in the modern view, is not a penalty, where defendant has used plaintiff's property and withheld compensation; it is deemed an appropriate part of full and adequate compensation. Had GM taken a license, it would have made periodic payments, including interest for delay in making such payments. Plaintiffs have been deprived of the use of the money. Defendant has enjoyed the use of the money. Interest here, the Master and both courts below have found, as fact, is part of adequate compensation. To withhold it is, as the Court of Appeals below held, a penalty on the innocent patent holder and a windfall to the (albeit good faith) wrongdoer (A336-337).

GM argues that discretion was improperly exercised below in allowing interest from date of infringement (Br. 20, 22-25). The Master, the District Court, and the Court of Appeals all held that such interest should be awarded, in the exercise of discretion. This Court, as noted, *supra*, p. 24, does not review the exercise of discretion under such circumstances as there is no showing "of a very obvious and exceptional showing of error". *Graver, supra.* Interest "is given in response to considerations of fairness" and certainly, the Court "cannot say that the [award] was either so unfair or so inequitable as to require [the Court] to upset it." *Blau* v. *Lehman,* 368 U.S. 403, 411 (1962).* In plaintiffs' view, of course, interest from date of infringement was mandatory. But in any event, if discretionary the discretion in favor of interest was soundly exercised. The considerations calling for the award have been summarized above: the Master's view (pp. 4-6), the District Court's (pp. 6-7). and the Court of Appeals' (pp. 7-9). All that GM opposes to these considered and mutually supporting determinations is that it defended in good faith and not recklessly. Surely that is not enough to show that it should be given a windfall in the way of interest-free use of royalty money belonging in equity to the patent holder, for a period extending over a quarter of a century.

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* *Blau* invloved a statutory penalty (Sec. 16(b) of the Securities Exchange Act of 1934); therefore, in contrast to our case, adequacy of compensation was not an issue, the statute was silent about interest, and both lower courts determined in their discretion that interest would be unfair on the facts of that case.

GM argues (Br. 22-25) that plaintiffs were guilty "of repeated acts of inequity" (Br. 22); "of over-reaching, largely rejected, and time consuming contentions" (Br. 25), as a basis for penalizing plaintiffs by withholding interest. There are no findings of the Master to support the argument and it is not supported by the record.* In the District Court, GM made substantially the same argument as a basis for denying interest; also, for withholding costs. The District Court rejected the argument, stating (A229):

> "Remaining to be discussed is the division of costs, a topic which the Master did not treat. Rule 54 provides that 'costs should be allowed as of course to the prevailing party.' A prevailing party is the party which, although it might not sustain all of its claims, receives a favorable judgment. Rule 54 further provides that a court may, in the exercise of sound discretion, vary this rule, but the situations in which this is done appear to be limited, involving unnecessary delay or only slight success on the part of the prevailing party, etc. *In this case, Devex has done no*

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* GM's statement (p. 25), that plaintiffs "achieved no damages judgment at all on 75% of the accused processes" is misleading; most of these comprised non-bumper infringement, as to which the Master found there was infringement by GM —a tort—and that "the invention was of some . . . value (A213-214) given (non-quantified) weight in computing the damages (A260). Contrary to GM, plaintiffs' proofs on value of the bumper infringement were highly pertinent, included among all the circumstances which justified the reasonable royalty. ("There was evidence in the record justifying . . . basic reliance on the .75% figure" A334), as contrasted with GM's formula of soap cost savings which the Master spurned as "contrived" (A243).

> *worse than fully litigate its claims achieving a large judgment in its favor. The Court, thus, sees no reason for relieving GM, whose infringement necessitated this case, from the normal responsibilities of a wrongdoer.*
>
> GM asks, however, that at least a portion of the Master's fee be taxed to Devex. Costs of reference are treated as costs within the meaning of Rule 54. Although courts are empowered to treat differently the payment of masters' fees and the payment of other costs, the Court sees no reason for doing so here. Consequently, it will order GM to pay the Master's entire fee." (Footnotes omitted).

The Court of Appeals affirmed this holding, too (A340, n. 20).

The District Court thus characterized the patent holder as diligent and victorious, and GM as "a wrongdoer". Similarly, the Court of Appeals, in considering the interest issue, referred to plaintiffs as "the innocent party" (A337) and to GM's "wrongdoing" (A239).

GM's argument rehashes GM's contentions as to the merits (alleged overclaiming pp. 22-23; alleged estoppel pp. 23-4; supposedly required coaction, p. 24; calculation of damages, p. 25). They were overruled by all three tribunals below and this Court by Order denied GM's petition for certiorari to review those rulings. In seeking to raise them now, despite this Court's Order, GM flouts Supreme Court Rule 34.1(a): "the brief may not raise additional questions" to those allowed for review.*

In summary, GM's brief ignores the plain meaning of Section 284, with its purpose to award "adequate" compensation. It ignores the express inclusion of a provision for interest when the statute was amended in 1946 in contrast to the statute prior to amendment. It ignores the legislative history quoted by this Court in *Aro, supra* expressing the joint recommendation of both House and Senate Committees, never revoked, that interest from date of infringement be awarded, like costs, in the normal case where the recovery is based on a reasonable royalty. It ignores the finding of fact that reasonable royalty here is predicated on hypothetical negotiations that would have included an agreement on periodic payments with interest—by contract or contract law—for delay in making such payments. It ignores the modern view that the award of interest is not a penalty but that the withholding of such an award would be a penalty on the patent holder and a windfall to the infringer-wrongdoer.

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* For answers to GM's contentions, *see, e.g.*, the Opinion of the Court of Appeals (A324-334) and plaintiffs Brief in Opposition to GM's Petition for Certiorari (pp. 2-16, 29-30).

Plainly interest from date of infringement is a desirable part of the patent system. It encourages amicable licensing, without foreclosing challenges by licensees to doubtful patents. It discourages litigation merely for the purpose of delay. It recognizes the substantial impact of severe inflation. It is simple fairness and equity.

All three tribunals below agreed that if interest as delay compensation is not mandatory, then discretion at least is involved, and such discretion should be exercised in favor of the award of interest to the patent holder from date of infringement. Clearly this was not error.

10

CONCLUSION

The judgment should be affirmed.

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No. 81-1661

In the Supreme Court of the United States

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,
Petitioner,

vs.

DEVEX CORPORATION, ET AL.,
Respondents.

**On Writ of Certiorari to the
United States Court of Appeals
for the Third Circuit**

REPLY BRIEF ON THE MERITS FOR PETITIONER, GENERAL MOTORS CORPORATION

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[1] Exhibit 1, this brief, is a statement under Rule 28.1 replacing Exhibit 1 of our main brief on the merits.

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Respondents.

REPLY BRIEF ON THE MERITS FOR PETITIONER, GENERAL MOTORS CORPORATION

- I -

35 USC 284 DOES NOT MANDATE INTEREST.

Respondent Devex Relies Upon Congressionally Rejected Language Excluded From The Statute Before It Became Law.

Devex argues that 35 USC 284 explicitly *mandates* prejudgment interest on reasonable royalty damages from the time of infringement. It repeatedly refers (out of context) to a quotation by four members of this Court from the House report on the early version of the 1946 Patent Act in *Aro Mfg. Co. v. Convertible Top*, 377 U.S. 476, 505-6 (1964), Brief, pp. 7, 9, 12, 18-20, 26, and 27. The sole purpose of the *Aro* quotation was to confirm that the 1946 Act eliminated recovery of the infringer's profits. The *Aro* Court was not concerned with prejudgment interest and did not discuss or rule upon it. Devex also fails to point out that the quoted language requiring interest from the date of infringement was in the bill at the time of the quoted House report, but was rejected by the Senate, and that the House thereafter concurred in the rejection. Further, the mandatory interest language of the House report quoted in *Aro* was conspicuously excluded from the 1946 Patent Act and its successor 35 USC 284. Indeed, as Devex concedes, "Section 284, adopted in 1952, was not intended to change the applicable provision as enacted in 1946". Brief p. 14.

The *Aro* quotation was held to be non-controlling in relation to prejudgment interest in *General Electric v. Sciaky Bros.*, 415 F. 2d 1068, 1077 (6th Cir., 1969), the first decision which addressed the matter. After carefully analyzing both the quotation and the statutory history, the court stated that "... Whatever prior versions of the bill or earlier committee reports may have stated, however, the critical fact is that the bill was amended so as to delete the reference to 'interest from the time infringement occurred'." Significantly, the district court opinion — which was quoted and relied upon by the Court of Appeals — cited *Duplate v. Triplex* 298 U.S. 448, 459 (1936) and stated that "Were willful infringement not found, the rule would require interest to run as of the date damages were liquidated." See also our main brief, p. 19.

The Term "Compensate" in 35 USC 284 Does Not Require Interest.

Devex singles out the word "compensate" in 35 USC 284, repeats it over fifty times in its brief, and rewrites it to a clause reading "compensate, *including interest from the date of* *infringement*''. Devex then argues that this is a ''plain meaning'' of controlling significance.

This Devex contention is doubly wrong. First, it is an impermissible reconstruction of the statutory language. Second, it conflicts with the balance of the statute. 35 USC 284 states ''adequate to compensate...in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest...as fixed by the court''. JA 1. Minimum damages of not less than a reasonable royalty were first made statutory in the 1946 Act. 60 Stat. 778, JA 2. The statute codified this Court's earlier decision in *Dowagiac Mfg. Co. v. Minnesota Moline,* 235 U.S. 641, 648 (1915). Reference to interest likewise first appeared in the patent statutes in the 1946 Act. That language codified this Court's prior decisions on interest in patent cases, including *Duplate v. Triplex.*

When the statute is read as a codification of this Court's *Duplate* decision — as we urge it should be — all parts are given effect and none are redundant or inconsistent. Such construction should always be applied, if possible. *American Textile Mfgrs. Inst. v. Donovan,* 452 U.S. 490, 513 (1981).

In contrast, the Devex reading of ''compensate'' conflicts with and would nullify the statutory specification of the reasonable royalty as minimum damages, and it equally conflicts with and would nullify the interest language of the statute. It is plainly wrong.

No cases under the 1946 Patent Act or 35 USC 284 support the Devex construction of ''compensate''. *Waite v. United States,* 282 U.S. 508, 509 (1931)(brief, pp., 6, 12) and *Jacobs v. United States,* 290 U.S. 13 (1933)(brief, p. 13), did not involve either statute and, further, preceded this Court's decision in *Duplate v. Triplex,* 298 U.S. 448, 459 (1936).

-II-

35 USC 284 CODIFIES THIS COURT'S INTEREST DECISIONS, INCLUDING DUPLATE V. TRIPLEX.

Once the plainly erroneous mandatory prejudgment interest ruling of the courts below has been resolved, the principal issue here is the continued viability of *Duplate v. Triplex*, 298 U.S. 448, 459 (1936). This case was repeatedly referred to and heavily relied upon throughout GM's Brief on the Merits. But it is not discussed, or **even cited**, in Devex's purported Answering Brief.

Instead of a forthright discussion of *Duplate*, the Devex brief relies upon diversionary arguments. A typical example is Devex's assertion that "[o]nly one Court of Appeals, the 7th Circuit" requires a finding of special circumstances as a condition precedent to an award of prejudgment interest on reasonable royalty patent infringement damages (brief, pp. 20, 25). This is not so. When prejudgment interest has been awarded, there have been explicit findings that the patent infringer acted in bad faith or in a willful and wanton manner, or even in contempt of court.[2] The cases cited by Devex, including **our** page references to findings which follow the *Duplate* "special circumstances" guidelines, are: *Radiator Specialty Co. v. Micek*, 395 F. 2d 763 at 764-5 (9th Cir.,

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[2] *Abbott v. Barrentine*, 160 USPQ 524, 527 (N.D. Miss., 1968), and *Colt Industries v. Index-Werke*, 205 USPQ 990, 1006 (D.D.C., 1979), are the only cases cited by Devex which can be exceptions. Neither was appealed.

1968)(Devex brief, pp. 20, 27); *Hartford Nat'l. Bank v. E.F. Drew,* 188 Fed. Supp. 353, 357, and 363 (D. Del., July 26, 1960), aff'd. 290 F. 2d 589 (3d Cir., 1961) (cited in Devex brief at pages 11, 18, and 20, but only as the later, October 24, 1960, decision, reported at 188 Fed. Supp. 347); *General Electric Co. v. Sciaky Bros.*, 415 F. 2d 1068 at 1076-7 (6th Cir., 1969)(Devex brief, pp. 19, 20); *Wahl v. Carrier Mfg. Co.*, 511 F. 2d 209 at 214-5 (7th Cir., 1975)(Devex brief, pp. 20, 21); *H.K. Porter v. Goodyear Tire and Rubber Co.*, 536 F. 2d 1115 at 1124 (6th Cir., 1976)(Devex brief, p. 27); *Corometrics Medical Systems v. Berkey Bio-Engineering,* 193 USPQ 467 at 478-9 (N.D. Cal., 1977)(Devex brief, pp. 19-20); and *Milgo Electronics v. United Business,* 623 F. 2d 645 at 667-8 (10th Cir., 1980) (Devex brief, p. 20).

Other decisions following the *Duplate* guidelines but overlooked by Devex include: *Wm. Bros. Boiler and Mfg. v. Gibson-Stewart,* 312 F. 2d 385 at 387 (6th Cir., 1963); *Dixie Cup v. Paper Container Mfg.*, 169 F.2d 645, 651 (7th Cir., 1948); *Union Carbide Corp. v. Graver Tank,* 282 F. 2d 653, 676-7 (7th Cir., 1960); *CBS v. Zenith Radio,* 537 F. 2d 896, 897-8 (7th Cir., 1976); *Ellipse Corp. v. Ford Motor Co.*, 614 F. 2d 775 (7th Cir., 1979); *Carter Products v. Colgate-Palmolive Co.*, 214 Fed. Supp. 383, 416-7 (D.C. Md., 1963); *Medtronic, Inc. v. Catalyst Research Corp.*, 547 Fed. Supp. 401, 416-7 (D. Minn., 1982); and *Randolph Laboratories v. Specialties Devel.*, 213 F. 2d 873, 875 (3rd Cir., 1954).

Marvel Specialty v. Bell Hosiery Mills, 386 F. 2d 287, 290 (4th Cir. 1967) (Brief, pp. 18 and 25) is inapposite because it was concerned only with established royalty damages. An established royalty requires a substantial number of issued licenses at similar royalties and other terms demonstrating an accepted industry view that the patent is valid and warrants the royalties. Such damages are readily ascertainable at all times by a simple arithmetic calculation. Established royalty damages have accordingly always been subject to a different treatment as to interest than reasonable royalty damages, which are not spelled out in contemporaneous license agreements, are dependent upon what hypothetical bargainers would agree upon, and are notoriously difficult to liquidate.

Even the Second Circuit's *Georgia-Pacific* decision affirmed the award of interest from the date of last infringement only after noting the infringer's reckless conduct. And even then the court conceded that its view that 35 USC 284 changed *Duplate* "is not free from doubt". *Georgia Pacific Corp. v. U.S. Plywood-Champion,* 446 F. 2d 295, 302 (1971).

Moreover, there is no decision in any case that the public interest in patent validity is any less today than it was at the time of *Duplate v. Triplex.* The need to encourage private enterprise to mount good faith, non-reckless, challenges to patent validity expressed in *Lear, Inc. v. Adkins,* 395 U.S. 653, 670 (1969), remains. Devex does not respond to the sound reasoning of this case by ignoring it.

Amicus, D.C. Bar Association, would dismiss *Duplate v. Triplex* as "another early case addressing the common law rule". Page 9, fn. 5. But it is unable to list the factors that are supposed to govern exercise of the discretion it says replaced that decision. Page 4, fn. 1. No such factors exist. The 1946 Patent Act and 35 USC 284 are entirely consistent with this Court's decisions, the statutory history identifies no deficiency of such decisions sought to be cured, and the statutes express no guidelines. Here, as in *Robert C. Herd v. Krawill Mach. Corp.,* 359 U.S. 297, 304-5 (1959), the statutes are not to be construed as making an innovation upon the existing case law that they do not fairly express.

-III-

CONTRARY TO RESPONDENT DEVEX, THERE IS NO APPLICABLE "MODERN APPROACH" TO INTEREST

Devex relies on a supposed contrary "modern approach" on interest exemplified by the ruling below. Brief, p. 14. A "modern approach" cannot alter 35 USC 284, even if it exists. But it does not exist. On the contrary, the supposed "modern approach" relied upon is the residuum of an earlier erroneous dictum of the district court which decided this case. That dictum mistakenly observed a trend favoring the allowance of interest in reasonable royalty cases. *W.L. Gore v. Carlisle Corp.*, 198 USPQ 353, 371 (1978). The court there observed a "dramatic liberalization" in interest awards under 35 USC 284 and that "the law now seems to favor the assessment of compensatory interest on reasonable royalty awards, where necessary to make whole an injured patentee". But the analysis rested on the mistaken assumption that the Seventh Circuit in *CBS v. Zenith Radio*, supra, had rejected *Duplate.* On the contrary, the Seventh Circuit in *CBS* had followed *Duplate* and reversed a trial court judgment rejecting that decision. Actually, the overwhelming weight of authority favors *Duplate.*

The Master here considered himself controlled by the *Gore v. Carlisle* dictum to award prejudgment interest. J.A. 265. As a result he swept aside *Duplate* and the numerous decisions which have followed it. He added the gratuitous statement that he would have exercised his discretion (if he had it) in favor of awarding interest. Id. But this was not a proper and independent exercise of discretion. Indeed, it was not based on discretion at all but rather on the situation that exists in every reasonable royalty case, namely that the defendant had use of the money prior to the judgment. The master's award was based on an error of law rather than exercise of discretion. It should have been corrected rather than adopted by the courts below.

Devex totally ignores *Duplate v. Triplex,* but nevertheless would have this Court cast aside the distinction there made between liquidated and unliquidated reasonable royalty damages for patent infringement. It treats this Court's decision in *Funkhouser v. J.B. Preston Co.*, 290 U.S. 163, 168 (1933), as if it overruled *Duplate* in advance. Brief, p. 23. The *Funkhouser* case held only that a state statute allowing prejudgment interest in contract cases was constitutional. The holding is obviously inapplicable to interest on unliquidated reasonable royalty patent infringement damages, which cannot be ascertained until it is determined (1) what the patent scope is and (2) what reasonable royalty rate applies to acts within the patent scope. The unpredictability is dramatically shown in this very case. In 1980, twenty-four years after the present case was filed, the master and the district court could not agree on either patent coverage or the reasonable royalty rate. Overturning the master, the district court held that the rinse processes infringe. JA 289. Likewise overturning the master, the district court added 50 percent to the reasonable royalty rate. JA 294. The distinction between unliquidated and liquidated patent reasonable royalty damages as made in the *Duplate* case is plainly sound.

-IV-

EVEN IF 35 USC 284 RELAXES DUPLATE, INTEREST IS PRECLUDED HERE.

Duplate v. Triplex is sound law and should be adhered to. But if — contrary to our view — that decision is not strictly followed, affirmance of the judgment below requires some very strong equity for Devex that outweighs the finding that GM acted in good faith and not recklessly. No such equity was relied upon below. Rather, the court below justified the interest award only by reference to this Court's *Aro* quotation and by generalizations based on the availability to GM of the judgment sums from the dates of infringement to the date of judgment — a ruling that is synonymous with mandatory interest.

Devex now strives to support the ruling below by pointing to the prolonged duration of this particular case. Brief, pp. 21-2. But it does not examine the specific delays that account for the duration of the case or the reasons they occurred. Had Devex done so, it would be apparent that the excessive duration of this case resulted from Devex strategy and that it dictates disallowance of interest, not the converse.

Although Plaintiffs were Ohio citizens, and GM was a Delaware corporation, this suit was filed in the Northern District of Illinois. JA 422-3. Venue could exist only if, as was alleged, GM infringed within such District. Id. GM promptly raised the venue defense by a motion to dismiss before answer, supported by affidavits.[3] On May 19, 1957, Judge Barnes denied the motion. He warned Devex that "... I am not sure you should thank me. If there is no showing to prove infringement in this district, you won't have an adjudication."[4]

In 1965, after the validity determination and mandate from the Court of Appeals, Judge Robson stated that "I intend to proceed with your question of venue...."[5] Devex then pursued additional discovery on venue. It then moved to transfer to the District of Delaware. JA 473. The motion was based on 28 USC 1406(a), which applies only when venue is laid in the wrong district.[6] JA 473. GM, which had maintained all along that venue was lacking, urged that the case should be dismissed under the statute.[7]

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[3] Motion, March 7, 1957. Box 12 of record in this Court.

[4] Hearing of May 19, 1957, box 12 of the record in this Court. Also, pages 132-3 of the printed appendix on the 1971 Devex appeal to the Third Circuit (Box 13 of the record filed in this Court).

[5] Hearing January 14, 1965, box 12 of the record in this Court. Also, printed appendix on the 1971 Third Circuit appeal, p. 305. Box 13 of the record in this Court.

Devex could have conducted all of its venue discovery in 1957 rather than eight years later. Had it done so, venue would have been the threshold issue that it should have been. The motion to transfer would have been made in 1957 and the Delaware court would doubtless have completed trial and rendered judgment on both validity and infringement well before the case was finally transferred in 1965. In addition, it would have been unnecessary for a court previously unacquainted with the complex chemical subject matter to take over a still incomplete case almost a decade after the complaint was filed.

Finally, two years after Judge Robson indicated his intent to decide venue, and over ten years after this case was filed, Judge Wright of the District of Delaware ruled on venue. *Devex v. General Motors,* 263 Fed. Supp. 17, 17-24. (1967). He carefully pointed out that "... To refuse to follow the Seventh Circuit's determination would unnecessarily prolong a case which has already aged ten years", and held that GM waived venue by failing to appeal from the June 29, 1962 judgment of patent invalidity. Id. at 21. No decision has ever been made that GM committed an infringing act in the Northern District of Illinois. No such process was among the 61 processes accused in the accounting proceedings.

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[6] **§1406. Cure or Waiver of Defects**

(a) The district court of a district in which is filed a case laying venue in the wrong division or district shall dismiss, or if it be in the interest of justice, transfer such case to any district or division in which it could have been brought.

* * * * *

[7] Brief, May 21, 1964, and motion to dismiss, May 25, 1965. Box 12 of the record in this Court.

The delays were amplified by the earlier Devex choice of an overreaching and invalidly broad claim. The Seventh Circuit validated the claim only by discarding the literal claim language and applying a strict and narrow claim construction based on the borax chemical coaction relied upon by Devex. JA 61 and 94-5. That decision was contrary to the ruling of this Court in *Graver Tank v. Linde Air Products Co.*, 336 U.S. 271, 276-7 (1949), which refused to narrow an invalidly broad claim to save validity. Devex took advantage of the undefined claim coverage to make sweeping infringement charges. It took the series of decisions extending from Judge Robson's Houdaille motion decision in 1965 (JA 76) to the 1980 District Court accounting decision in this case (JA 280, 289) to settle claim scope.[8] See our main brief, pp. 22-25.

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[8] (a) December 15, 1965 — summary judgment on infringement based on soap and borax over phosphate bumper production, *Devex v. Houdaille*. JA 76.

(b) January 16, 1967 — denial of a similar motion for summary judgment, *Devex v. General Motors*. 263 Fed. Supp. 17, 24-6.

(c) July 12, 1967 — reversal of summary judgment, *Devex v. Houdaille*, JA 85, 100.

(d) November 8, 1967 — denial of discovery on non-borax processes because claim limited to borax, *Devex v. General Motors*. JA 757, 761.

(e) May 23, 1968 — leave to amend complaint to assert infringement by processes not using borax but involving the same coaction to produce the same new and unexpected results. *Devex v. General Motors*. JA 101, 104.

(f) September 8, 1970 — opinion, findings, and judgment holding non-infringement after trial, *Devex v. General Motors*. JA 105, 110.

(continued on next page)

Judge Barnes in 1957 explicitly warned Devex on venue. Even apart from that warning, Devex owed a duty to the courts and to the parties — when informed of the threshold issue of venue — to proceed consistently, diligently, and promptly. Instead, it put consolidation with *Houdaille* and the validity trial ahead of resolution of the venue question. It owed a like duty under 35 USC 112 (JA 1) to articulate the true patent coverage in a claim particularly pointing out the invention before patent issuance and in any event to adhere thereafter to a consistent position on claim coverage. The award of prejudgment interest below here sanctions Devex conduct offending both of these duties. Sound judicial administration requires that such conduct should be most strongly discouraged. It dictates disallowance of interest — not the converse.[9]

(continued from previous page)

(g) September 26, 1972 — reversal on non-infringement, *Devex v. General Motors*. JA 138, 147.

(h) February 7, 1980 — master's report on accounting holding non-infringement by 32 of the 61 accused processes, *Devex v. General Motors*. JA 186 and 190.

(i) August 22, 1980 — opinion of Judge Wright reversing master's holding of non-infringement by rinse processes, *Devex v. General Motors*, JA 289.

[9] Devex strives to shield its activities by recourse to Rule 34.1. Brief, page 30. The rule does not apply, however, to matter pertinent to the issue on certiorari. Moreover, Rule 34.1(a) states that this Court "may consider a plain error not among the questions presented but evident from the record and otherwise within its jurisdiction to decide". The "plain error" provision is particularly applicable to lengthy cases involving questionable patents, where consideration of the record as a whole on a narrow certiorari issue may expose other matter requiring this Court's ruling. See *Blonder-Tongue Labs. v. University of Illinois Foundation*, 402 U.S. 313, 319-20 (1971), *Aro Mfg. v. Convertible Top*, supra., at 502, and the opinion of Justices Douglas and Black in *Exhibit Supply Co. v. Ace Patents Corp.*, 315 U.S. 126, 138 (1942).

CONCLUSION

a) 35 USC 284 should not be construed to require mandatory prejudgment interest on reasonable royalty patent damage awards. The judgment below should be reversed.

b) 35 USC 284 codifies this Court's ruling in *Duplate v. Triplex*, supra, and requires "exceptional circumstances" before interest can be awarded on reasonable royalty patent damages awards. The finding here that GM acted in good faith and not recklessly precludes exceptional circumstances.

c) If 35 USC 284 relaxes the rule of *Duplate*, prejudgment interest should still be denied here because Devex's conduct unjustifiably prolonged this case.

Respectfully submitted,

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November 29, 1982

EXHIBIT I

The following information is provided by General Motors Corporation pursuant to Supreme Court Rule 28.1: All U.S. and Canadian subsidiaries of General Motors Corporation are wholly owned with the exceptions of Motor Enterprises, Inc., which is partly owned by the U.S. Small Business Administration, and GM Fanuc Robotics Corporation, which is partly owned by Fanuc Limited.

Foreign subsidiaries in which a private person could have a financial interest are as follows:

1. Fabrica Colombiana de Automotores S.A.
2. Gemeinnutzige Opel Wohnbaugesellschaft Mit Beschrankter Haftung
3. General Motors Acceptance Corporation, Nederland N.V.
4. General Motors de Colombia S.A.
5. General Motors Iran Limited
6. General Motors Kenya Limited Industrial Commercial Development Corporation
7. General Motors Pilipinas, Inc.
8. GM Allison Japan Limited
9. Industrija Delova Automobila, Kikinda
10. Isuzu Motors Limited
11. Isuzu Motors Finance Co., Ltd.
12. Saudi American Machinery Maintenance Company (SAMMCO)
13. Packard Electric Ireland Limited
14. Banque de Credit General Motors

15. Saehan Motor Company, Limited
16. Transfin (Proprietary) Limited
17. Suzuki Motor Company Limited
18. Isuzu Motors Overseas Distribution Corporation
19. Autos y Maquinas del Ecuador (AYMESA) S.A.
20. Omnibus BB Transportes, S.A.

Some of the processes accused as infringements were performed by Defendant using materials purchased under indemnity agreements with one or more of the following:

1. Amchem Products, Inc.
2. Bethlehem Steel Corporation
3. Braun Engineering Company
4. Colt Industries, Inc.
5. LTV Corporation
6. National Steel Corporation
7. Occidental Petroleum Corporation
8. Pennwalt Corporation
9. Republic Steel Corporation
10. United States Steel Corporation

Amicus Brief

MOTION FILED
AUG 9 1982

No. 81-1661

IN THE SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, Petitioner,
v.
DEVEX CORPORATION, ET AL, Respondents.

On Writ of Certiorari to the United States
Court of Appeals for the Third Circuit

MOTION FOR LEAVE TO FILE BRIEF AMICUS CURIAE

BRIEF AMICUS CURIAE FOR THE BAR ASSOCIATION OF THE DISTRICT OF COLUMBIA IN SUPPORT OF AFFIRMANCE

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No. 81-1661

IN THE SUPREME COURT
OF THE UNITED STATES

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION,

Petitioner,

v.

DEVEX CORPORATION, ET AL,

Respondents.

On Writ of Certiorari to the United States Court of Appeals for the Third Circuit

---

MOTION FOR LEAVE TO FILE BRIEF AMICUS CURIAE

The Bar Association of the District of Columbia respectfully requests the Court to grant it leave to file a brief as Amicus Curiae in General Motors Corporation v. Devex Corporation, et al, No. 81-1661, currently before this

Court. Amicus Curiae wishes to file its brief in support of affirmance of the opinion by the Third Circuit insofar as that opinion reposes in the trial court the discretion to award prejudgment interest on reasonable royalty damages for patent infringement.

This position differs from positions being urged by either of the parties on the principal issue in the matter now before the Court. The petitioner urges this Court to reverse the court below and hold that prejudgment interest on reasonable royalty damages in patent cases shall not be granted except in "exceptional circumstances." It is understood that respondents will take the diametrically opposed view that prejudgment interest should be awarded, as a matter of course, on reasonable royalty damages.

On July 16, 1982, the Association mailed letters to General Motors Corporation and Devex Corporation requesting permission to file an amicus brief in this case. In a letter dated July 23, 1982, counsel for General Motors informed counsel for the Association that General Motors would not consent to the filing of this amicus brief. No written response was ever received from Devex. Copies of the above-mentioned correspondence have been filed with the Clerk of the Court.

The Bar Association of the District of Columbia is a non-profit membership organization of over 4,400 attorneys. Association membership is not restricted to any segment of the profession, and its members and their clients thus represent widely divergent interests and views. Association members include attorneys in private practice as well as those employed by corporations and those in government. The Patent, Trademark and Copyright Law Section of the Association includes members of the bar interested in intellectual property law (including patents and related anti-trust and unfair competition concepts). Members of the Section regularly represent patentees and accused infringers and are thus concerned both with the enforcement of patents and with the defense against patent infringement actions.

Therefore, The Bar Association for the District of Columbia respectfully requests this Court to grant it leave to file a brief as Amicus Curiae in this case.

Respectfully submitted,

THE BAR ASSOCIATION OF
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On Writ of Certiorari

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BRIEF AMICUS CURIAE

FOR THE

BAR ASSOCIATION OF THE

DISTRICT OF COLUMBIA

IN SUPPORT OF AFFIRMANCE

I. AUTHORITY TO FILE

This amicus curiae brief is presented under Rule 36.3, together with a motion for leave to file brief amicus curiae.

II. THE BAR ASSOCIATION OF THE DISTRICT OF COLUMBIA AS AMICUS CURIAE AND ITS PURPOSE IN FILING THIS BRIEF

The Bar Association of the District of Columbia is a non-profit membership organization of over 4,400 attorneys. Association membership is not restricted to any segment of the profession, and its members and their clients thus represent widely divergent interests and views. Association members include attorneys in private practice as well as those employed by corporations and those in government. The Patent, Trademark and Copyright Law Section of the Association includes members of the bar interested in intellectual property law (including patents and related anti-trust and unfair competition concepts). Members of the Section regularly represent patentees and accused infringers and are thus concerned both with the enforcement of patents and with the defense against patent infringement actions.

In this brief, the Association presents to the Court a position which differs from positions being urged by either of the parties on the principal issue in the matter now before the Court. The petitioner urges this Court to reverse the court below and hold that prejudgment interest on reasonable royalty damages in patent cases shall not be granted except in "exceptional circumstances." It is understood that respondents will take the diametrically opposed view that prejudgment interest should be awarded, as a matter of course, on reasonable royalty damages.

It is the sole purpose of this brief to persuade this Honorable Court that the decision below should be affirmed insofar as it reposes in the trial court the discretion to award prejudgment interest on reasonable royalty damages for patent infringement.[1/]

III. THE DECISION BELOW

This case is the culmination of patent infringement litigation which

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[1/] In view of the numerous factual situations which might be encountered, amicus takes no position on the specific factors on which discretion should be exercised to award prejudgment interest either in this case or generally.

began twenty-six years ago.[2] In 1980, the trial court ultimately awarded damages of $8,813,945.50 and prejudgment interest in the sum of $10,912,291.05.[3]

The trial court's decision was upheld by the Court of Appeals for the Third Circuit which stated in relevant part:

> "The Special Master, affirmed by the district court, awarded interest (delay damages) at the prevailing corporate bond rate on the royalty payments as of the date those payments became due, calculated yearly (number of infringing parts made each year). On appeal, defendant contends that such an award was improper. We disagree,

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[2] While patent cases are notoriously lengthy, this case is extraordinary even by patent litigation standards. It is not surprising, therefore, that the question of prejudgment interest would loom large to the litigants here, and to patent litigants in general.

[3] Devex Corp. v. General Motors Corp., ___ F.2d ___, ___, 212 U.S.P.Q. 643, 650 n.7 (3d Cir. 1981).

> and hold that under the facts of this case the award of interest as the yearly royalty payments became due was not an abuse of discretion." 4/

Clearly, the Third Circuit concluded that the determination of when interest should commence is within the discretion of the trial court. It is this aspect of the Third Circuit's decision that is before this Honorable Court.

IV. STATEMENT OF THE ISSUE BRIEFED

WHETHER THE DECISION BELOW SHOULD BE AFFIRMED INSOFAR AS IT REPOSES IN THE TRIAL COURT THE DISCRETION TO AWARD PREJUDGMENT INTEREST ON REASONABLE ROYALTY DAMAGES FOR PATENT INFRINGEMENT.

Subsidiary issues are:

4/ Devex Corp. v. General Motors Corp., ___ F.2d ___, ___, 212 U.S.P.Q. 643, 657 (3d Cir. 1981).

a. Whether the governing statute, 35 U.S.C. Section 284, permitting award of "interest . . . as fixed by the court" is unambiguous in reposing in the trial court the discretion to grant prejudgment interest in patent cases.

b. Whether the contrary interpretations of the governing statute advanced by the petitioner and the respondents are inconsistent with the legislative history.

V. SUMMARY OF ARGUMENT

The historical background of the governing statute indicates that the statute modified the common law rule which permitted the award of prejudgment interest only in special or exceptional circumstances. The governing statute permitting the award of "interest . . . as fixed by the court" is unambiguous in reposing in the trial court the discretion to grant prejudgment interest in patent cases. The legislative history of the statute does not support an interpretation of the statute at variance with its clear meaning.

VI. ARGUMENT

A. The Historical Background of the Governing Statute Indicates That the Statute Modified the Common Law Rule Which Permitted the Award of Prejudgment Interest Only in Special or Exceptional Circumstances

In 1888, the common law rule on prejudgment interest in patent cases was enunciated by this Honorable Court in its opinion in Tilghman v. Proctor.[5] In that case, this Court addressed the issue of whether the master had properly refused to award interest on profits[6] for the time period prior to the date of the master's report. This Court stated:

> "If the question thus presented were a new one, it would require grave consideration. But by a uniform current of decisions of this court, beginning 30 years ago, the profits allowed in equity, for the injury that a patentee has sustained by the infringement of his patent, have been considered as a measure of unliquidiated damages, which, as a general rule, and in the absence of special circumstances, do not bear interest until after their amount

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[5] 125 U.S. 136 (1888); see also Crosby Steam Gauge & Valve Co. v. Consolidated Safety Valve Co., 141 U.S. 441, 457-458 (1891) which enunciates the identical rule. Another early case addressing the common law rule enunciated in Tilghman v. Proctor was Duplate Corp. v. Triplex Safety Glass Co., 298 U.S. 448 (1936).

[6] At that time, successful patentees in infringement cases were entitled to an award equivalent to the infringer's profits.

> has been judicially ascertained; and the provision introduced in the patent act of 1870 regulating the subject of profits and damages, made no mention of interest and has not been understood to affect the rule as previously announced."7/

No mention of interest was made in the patent statutes until 1946. In that year, 35 U.S.C. Section 70 (the predecessor to today's 35 U.S.C. Section 284) was amended to make damages the basis of a claimant's compensation rather than the infringer's profits. Along with the change as to damages, the language as to interest was inserted in essentially its present form. The relevant portion of the amended statute authorized an award of damages to a "claimant",

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7/ Tilghman v. Proctor, 125 U.S. at 160-161 (citations omitted) (emphasis added).

"together with interest and costs as fixed by the court."[8/]

The initial language of the bill which matured into the 1946 statute required the award of prejudgment interest:

> "the complainant shall be entitled to recover general damages which shall be due compensation for making, using, or selling the invention, not less than a reasonable royalty therefor, together with his costs and reasonable attorney's fees to be fixed by the court and interest from the time the infringement occured." [9/] (emphasis supplied)

While adopting The House of Representatives report, which in part stated "(t)he object of the bill is to make the basis of recovery in patent infringement suits general damages, that is, any damages that the complainant may

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[8/] 35 U.S.C. §70 (1946).

[9/] H.R. 5311 (1946).

prove, not less than a reasonable royalty, together with interest from the time the infringement occurred. . ."[10/], the Senate did modify the mandatory format of the House bill by replacing the language "together with interest from the time the infringement occurred" with the language "together with such . . . interest, as may be fixed by the court." [11/]

The patent statutes were codified in 1952 and the language concerning interest in the 1946 Act[12/] was incorporated in

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[10/] H.R. Rep. No. 1587, 79th Cong., 2d Sess. (1946) (emphasis added), quoted in S. Rep. No. 1503, 79th Cong., 2d Sess. (1946).

[11/] 35 U.S.C. §70 (1946).

[12/] 35 U.S.C. §70 (1946).

the present 35 U.S.C. §284.[13/]

The courts have applied the statute in at least three different ways when considering the matter of prejudgment interest. Some courts believe that §284 mandates the imposition of prejudgment interest on reasonable royalty damages.[14/] Other courts believe that §284 follows the old common law rule and have held that prejudgment interest is

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[13/] The modern §284 is a compilation of former sections 67 and 70 of Title 35 U.S.C., 1946 edition. See S. Rep. No. 1979, 82d Congress, 2d Sess. (1952).

[14/] Marvel Specialty Co. v. Bell Hosiery Mills, Inc., 368 F.2d 287, 290, n. 3 (4th Cir. 1967). See also Wayne Gossert Corp. v. Moretz Hosiery Mills, Inc., 447 F.Supp. 12 (W.D.N.C. 1976), aff'd, 573 F.2d 191 (4th Cir. 1978) and Colt Industries Operating Corp. v. Index Werke KG, ___F.Supp. ___, ___, 205 U.S.P.Q. 990, 1006 (D.D.C. 1979).

not allowed absent "exceptional circumstances."[15/] A third group of courts has applied the statute in what your amicus submits is the only proper manner, allowing the trial court to exercise traditional equity discretion in determining whether to award prejudgment interest in patent cases. This view is exemplified by recent decisions of four circuit courts of appeal.[16/]

[15/] Columbia Broadcasting System, Inc. v. Zenith Radio Corporation, 537 F.2d 896, 897 (7th Cir. 1976); Wahl v. Carrier Manufacturing Co., 511 F.2d 209 (7th Cir. 1975); Radiator Specialty Co. v. Micek, 395 F.2d 763, 764-65 (9th Cir. 1968).

[16/] Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc., 446 F.2d 295 (2d Cir. 1971); Trio Process Corp. v. L. Goldstein's Sons, Inc., 638 F.2d 661 (3d Cir. 1981); General Electric Co. v. Sciaky Bros. Inc., 415 F.2d 1068 (6th Cir. 1969); Milgo Electric Corp. v. United Business Communications, Inc., 623 F.2d 645 (10th Cir. 1980).

B. The Governing Statute Permitting Award of "Interest...as Fixed by the Court" is Unambiguous in Reposing in the Trial Court the Discretion to Grant Prejudgment Interest in Patent Cases

Statutory construction begins with a review of the language of the statute.[17] Where the statutory language is clear and unambiguous, no additional analysis is required.[18]

Section 284 of Title 35, U.S. Code, clearly states that upon a finding for a claimant, the court "shall" award damages adequate to compensate for the infringement, together with:

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[17] Diamond v. Chakrabarty, 447 U.S. 303, 307 (1980); Southeastern Community College v. Davis, 442 U.S. 397, 405 (1979).

[18] United States v. Oregon, 366 U.S. 643, 648 (1961).

> "interest...as fixed by the Court."[19/]

This language is not ambiguous. It consists of ordinary words which have no special meaning. The statute vests the power to award interest in the courts. This power is mandatory only in the sense that the court is required to fix some measure of interest. The date from which interest shall be awarded and the rate at which interest shall be awarded is not addressed in the statute. Simply, the courts are permitted to "fix" the interest to be awarded. The words of the statute, when considered in "their ordinary, contemporary common

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[19/] 35 U.S.C. Section 284.

meaning",[20] can only support one interpretation -- the district court is vested with the discretion to fix the nature and amount of interest to be awarded a prevailing claimant. This necessarily includes the discretion to fix the date on which interest begins to accrue, thus permitting the award of prejudgment interest.

C. The Legislative History of the Governing Statute Does Not Support An Interpretation of the Statute at Variance with its Clear Meaning

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[20] *See* Perrin v. United States, 444 U.S. 37, 42 (1979).

Two alternative interpretations of the governing statute are proposed by the parties: 1) that award of prejudgment interest is mandatory and 2) that prejudgment interest should be awarded only in exceptional circumstances. Both interpretations are clearly inconsistent with the statutory history of the bill.

As to the first interpretation, if prejudgment interest were intended to be mandatory, the mandatory language of the original House bill would not have been deleted in favor of the Senate version.[21]

As to the second interpretation, if prejudgment interest were intended only in exceptional cases, the language favoring prejudgment interest in the

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21/ Respondent has argued in its Brief in Opposition to the Petition for Writ of Certiorari that the mandatory language of the House report was sanctioned by this Court when that language was cited in Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476, 505-506 (1964). There this Court recited the legislative history of the 1946 Act and quoted the House report: "The object of the bill is to make the basis of recovery in patent infringement suits general damages, that is, any damages the complainant can prove, not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages." It appears, however, that the sole purpose of the citation was to support the proposition that the purpose of the change was to eliminate the recovery of profits as such and to allow the recovery of damages. Therefore it appears that this Court did not sanction that language as standing for the proposition that the present §284 requires a trial court to award interest back to the date of infringement.

House Report would not have been adopted by the Senate. Surely, if the Senate had intended to forbid as a matter of principle all prejudgment interest, the House report would not have been adopted.

Since the 1946 Act, the exceptional case standard has been added to the patent statutes in the context of the award of attorney's fees.[22/] The

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[22/] In 1952, the governing statute, 35 U.S.C. Section 284 was enacted as a compilation of former sections 67 and 70 of Title 35 U.S.C., 1946 edition. Section 285, relating to the award of attorney's fees, was compiled at this time out of another part of Section 70 of Title 35 U.S.C. The 1946 act provided that "(t)he Court may in its discretion award reasonable attorney's fees to the prevailing party". The 1952 act provides that "(t)he court in exceptional cases may award reasonable attorney's fees to the prevailing party." (emphasis supplied). No parallel change was made in the interest provisions of the Patent Statutes.

standard was not made generally applicable so as to cover interest awards. This evidences a continuing intent by Congress not to impose the exceptional case standard in the case of interest awards.

The interpretations proposed by petitioner and respondents having been eliminated, only one interpretation of the legislative history surrounding the 1946 Act remains. The award of prejudgment interest, not being precluded and not being mandatory, is left to the trial court's discretion.

D. Conclusion

This Honorable Court should affirm the decision of the Third Circuit insofar as it reposes in the trial court the discretion to award prejudgment interest on reasonable royalty damages. The governing statute, 35 U.S.C. §284, is unambiguous in permitting an award of prejudgment interest at the discretion of the trial court. Moreover, if ambiguity exists, the legislative history of 35 U.S.C. §284 demonstrates that Congress intended a trial court to have broad discretion in awarding damages under §284. Prejudgment interest awards should be neither mandatory, nor disallowed without finding of exceptional circumstances.

Respectfully submitted,

THE BAR ASSOCIATION OF
THE DISTRICT OF COLUMBIA

By their counsel

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Supplemental Brief

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No. 81-1661

IN THE SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, Petitioner,
v.
DEVEX CORPORATION, ET AL, Respondents.

On Writ of Certiorari to the United States
Court of Appeals for the Third Circuit

MOTION FOR LEAVE TO PARTICIPATE IN ORAL ARGUMENT AS AMICUS CURIAE AND FOR ADDITIONAL TIME FOR ORAL ARGUMENT

Bar Association of the District of Columbia

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The Bar Association of the District of Columbia respectfully requests the Court to grant it leave to participate in oral argument as Amicus Curiae and for additional time for oral argument in General Motors Corporation v. Devex Corporation, et al, No. 81-1661, currently before this Court. Amicus Curiae wishes to argue in support of affirmance of the opinion by the Third Circuit insofar as that opinion reposes in the trial court the discretion to award prejudgment interest on reasonable royalty damages for patent infringement.

Participation in oral argument is believed necessary because the position advanced by Amicus Curiae differs from positions being urged by either of the parties on the principal issue in the matter now before the Court. The petitioner in its brief urges this Court to reverse the court below and hold that prejudgment interest on reasonable royalty damages in patent cases shall not be granted except in "exceptional circumstances." Respondents in their brief have taken the diametrically opposed view that prejudgment interest should be awarded, as a matter of course, on reasonable royalty damages.

Because only Amicus Curiae favors the discretionary standard applied by the Court below, it is respectfully submitted that Amicus Curiae requires time for oral argument to develop its position before this Honorable Court.

Ten minutes of oral argument time are requested.

Respectfully submitted,

THE BAR ASSOCIATION OF
THE DISTRICT OF COLUMBIA

By their counsel

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Reply Brief

NO. 81-1661

AUG 2 7 1982
OFFICE OF THE CLERK
SUPREME COURT, U.S.

IN THE SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, Petitioner,

v.

DEVEX CORPORATION, ET AL., Respondents.

On Writ of Certiorari to the United States
Court of Appeals for the Third Circuit

GENERAL MOTORS' OPPOSITION TO MOTION BY BAR ASSOCIATION OF THE DISTRICT OF COLUMBIA TO PARTICIPATE IN ORAL ARGUMENT AS AMICUS CURIAE

The Bar Association's motion appears to be based on the erroneous premise that neither petitioner (General Motors Corporation) nor respondent has presented for adjudication by this Court the possibility of construing the statute in issue (35 U.S.C. §284) to permit a discretionary award of prejudgment interest even in the absence of exceptional circumstances.

Contrary to the Bar Association's assertions, one of General Motors' major points in its Brief on the Merits is directed to this interpretation of the statute. It specifically refers to such an interpretation in the Summary of Argument (page 11) and discusses it in detail throughout Section IV of the Argument (pages 22-25).

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Since the point to which the Bar Association's motion is directed is fully covered in General Motors' Brief on the Merits, the motion should be denied.

Respectfully submitted,

A.G. Connolly by A.G. Connolly

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Attorneys for Petitioner
General Motors Corporation

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NO. 81-1661

IN THE SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, Petitioner,

v.

DEVEX CORPORATION, ET AL., Respondents.

On Writ of Certiorari to the United States
Court of Appeals for the Third Circuit

CERTIFICATE OF SERVICE

I hereby certify that true copies of the foregoing GENERAL MOTORS' OPPOSITION TO MOTION BY BAR ASSOCIATION OF THE DISTRICT OF COLUMBIA TO PARTICIPATE IN ORAL ARGUMENT AS AMICUS CURIAE were served by first class mail, postage prepaid, on respondents' attorneys:

David F. Anderson
350 Delaware Trust Building
Wilmington, DE 19899

William C. McCoy, Jr.
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Lynn Alstadt
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and on the attorneys for the Bar Association of the District of Columbia:

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Brian J. Leitten
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this 26th day of August, 1982.

Lester J. Taufen

Lester J. Taufen
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1800 Farmers Bank Building
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NO. 81-1661

IN THE SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1981

GENERAL MOTORS CORPORATION, Petitioner,

v.

DEVEX CORPORATION, ET AL., Respondents.

On Writ of Certiorari to the United States
Court of Appeals for the Third Cricuit

STATEMENT OF MAILING

STATE OF DELAWARE:
: SS.
NEW CASTLE COUNTY:

BE IT REMEMBERED that on this 26th day of August, 1982, personally came before me, a Notary Public for the State and County aforesaid, Lester J. Taufen, who, being duly sworn according to law, did depose and say:

"I am a member of the Bar of the United States Supreme Court. On August 26, 1982, forty (40) copies of the attached GENERAL MOTORS' OPPOSITION TO MOTION BY BAR ASSOCIATION OF THE DISTRICT OF COLUMBIA TO PARTICIPATE IN ORAL ARGUMENT AS AMICUS CURIAE were mailed to the Clerk of the United States Supreme Court, properly addressed and with proper postage prepaid, by United States Postal Service Express Mail.

Lester J. Taufen
Lester J. Taufen

SWORN TO AND SUBSCRIBED before me, a Notary Public for the State and County aforesaid this 26th day of August, 1982.

Notary Public
My commission expires December 29/82

Docket Sheet

NO. 81-1661-CFX (Vide: 81-1718) 81-1865	TITLE General Motors Corporation, Petitioner v. Devex Corporation, et al.
DOCKETED Mar. 9, 1982	COURT United States Court of Appeals for the Third Circuit

DATE	PROCEEDINGS AND ORDERS
	Counsel for Petitioner: Arthur G. Connolly
	Counsel for Respondents: Sidney Bender
Mar. 9, 1982	Petition for writ of certiorari filed. (Record filed).
Mar. 15, 1982	Appendix filed. (Vide: 81-1718).
Apr. 7, 1982	Brief for respondents Devex Corporation, et al. in opposition filed.
Apr. 14, 1982	DISTRIBUTED. 4-30.
Apr. 20, 1982	Reply brief for the petitioner filed. (D).
May 10, 1982	REDISTRIBUTED. 5-13.
May 17, 1982	REDISTRIBUTED. 5-20.
May 24, 1982	The petition for a writ of certiorari is GRANTED limited to question 1 presented by the petition.

July 10, 1982	Joint appendix filed. (Volumes 1 & 11)
July 10, 1982	Brief for the petitioner filed.
Aug. 9, 1982	Brief for the respondents filed.
Aug. 9, 1982	Motion of the Bar Assn. of D.C. for leave to file a brief as amicus curiae filed.
Aug. 17, 1982	Motion of The Bar Association of the District of Columbia for leave to praticipate in oral argument as amicus curiae and for additional time for oral argument filed.
Aug. 27, 1982	Opposition of petitioner General Motors Corporation filed.
Sept. 15, 1982	CIRCULATED.
Oct. 4, 1982	The motion of The Bar Association of the District of Columbia for leave to file a brief as amicus curie is GRANTED. The motion of The Bar Association of the District of Columbia for leave to participate in oral argument as amicus curiae is DENIED.
Nov. 29, 1982	Reply brief for the petitioner filed. (D).
Dec. 7, 1982	ARGUED.